... NAVAL
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Brassey's Naval & Shipping Annual

1924

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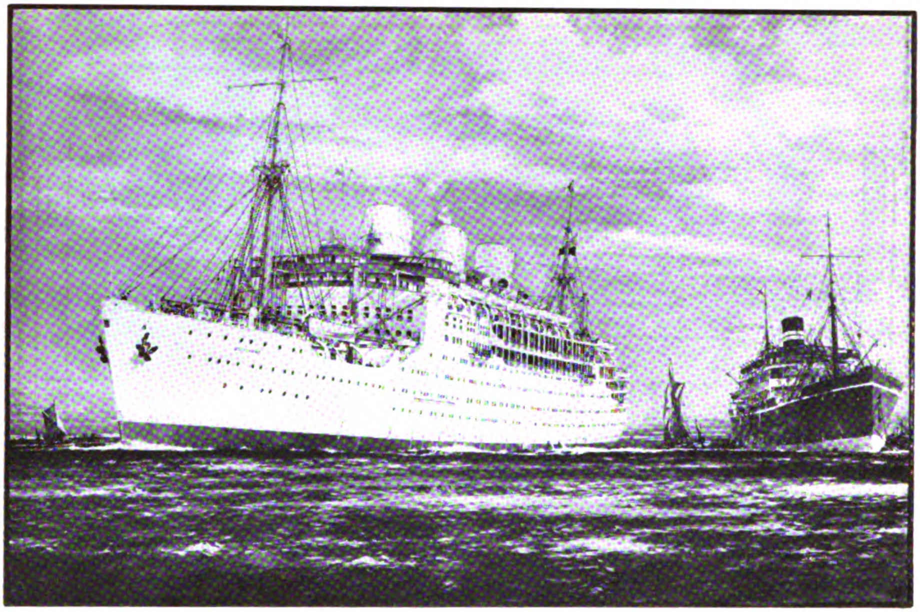
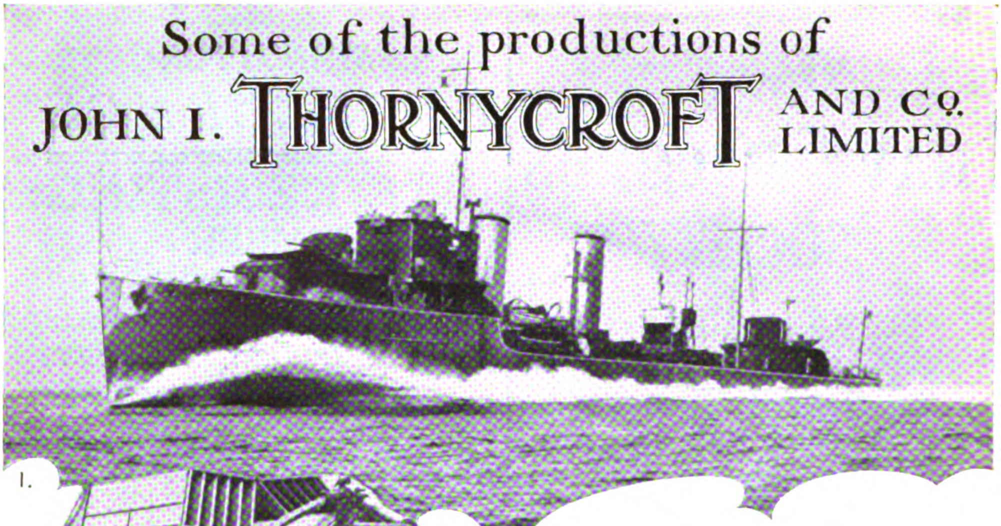


The "Strathaird," one of the P & O "White Sisters," and the British India Company's s.s. "Mashobra" in the Thames. From the painting by J. Spurling.

Some of the productions of JOHN I. THORNYCROFT AND Co. LIMITED



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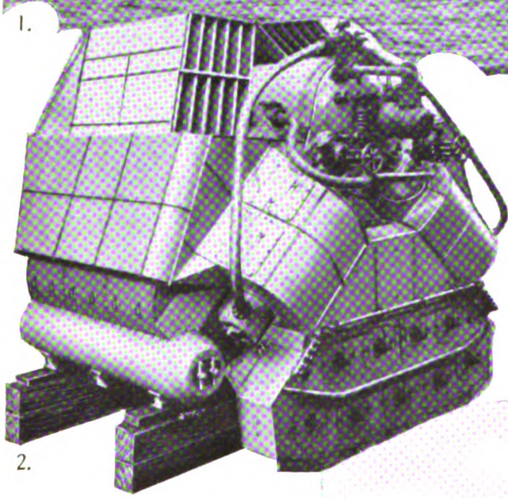

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Designers and Builders of

Destroyers, Destroyer Leaders, and fast Naval craft of all types, Steam Turbines, Marine Engines, Water Tube Boilers, Oil Fuel Gear, Propellers, etc.

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2. High-pressure water tube boiler for H.M.S. ACHERON
3. 42 ft. high-speed salvage craft for the Greek Air Force.
4. 55 ft. 40-knot Coastal Motor Boat for the Finnish Navy.

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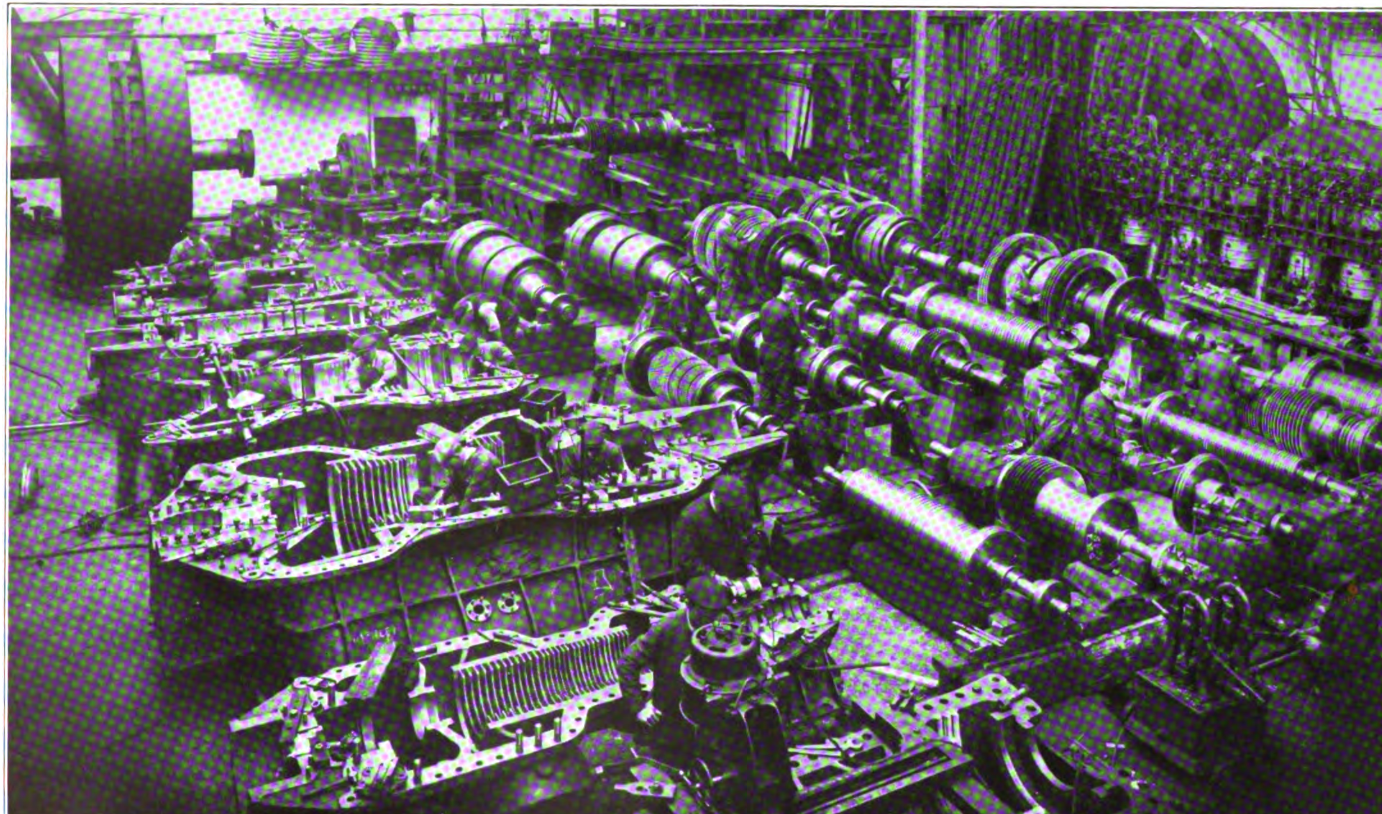

The Turbine Erecting Pits at the Naval Construction Works of Vickers-Armstrongs Limited, Barrow-in-Furness, with turbines of over 100,000 S.H.P. under construction.

BRASSEY'S

NAVAL AND SHIPPING ANNUAL.

1934.

EDITED BY

COMMANDER CHARLES N. ROBINSON, R.N.

AND

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PREFACE.

THIS forty-fifth issue of "Brassey's Naval and Shipping Annual" appears at a moment of grave anxiety for the British Commonwealth of Nations. Decisions fraught with the utmost importance in regard to our future as a great Power must be taken before 1934 is many weeks old. For years, while efforts have been made to establish the new international policy of "collective security," our standard of strength at sea, which had been built up after many generations of sound national policy, has been allowed to decline. Risks have been incurred as an earnest of good intention, and for two years now the British peoples have looked to the World Disarmament Conference at Geneva for some indication of a result of all these sacrifices, in the form of an adherence to the "principle of unanimity." They have looked in vain. The Conference, so far as any definite agreement for the limitation of naval armaments is concerned, has been barren of issue, and the League of Nations itself commands even less confidence than it did when the Conference began.

The hypothesis upon which British strength at sea has been allowed to decline was the imminence of a new world order. Such a new era is shown now to be farther off than ever. "A good example," said Mr. Ramsay MacDonald at the Guildhall Banquet, on November 10, 1930, "must be the ingredient in every agreement, but that example must be followed by other States. The old Adam is still rampant." That was over three years ago. The example has not been followed. The old Adam is more than ever rampant. New warship building programmes have appeared in various countries, notably the United States and Japan. What is Great Britain going to do? More than any other nation, we still live by the sea. Our very existence depends upon it. Failing any success from new methods of diplomacy and negotiation, our only possible course, if we are to continue as a leading Power, is to restore that which was dissipated in the years after the War.

Such a task of restoration would have been simple twenty years ago. It will now be much more difficult and costly. The reduction of our fleets and squadrons has been accompanied by the shrinkage of those unrivalled resources in men and material which built and maintained them. The value to the nation of the private firms which supply armaments is shown in two articles which appear in this

issue of the "Annual." If such firms, which do not exist entirely or even mainly for armament work, were allowed to close down, not only would the benefit of their resources and research work be lost to the country, but the change would bring ruin to thousands of people in some of the most vital trades. This is a branch of our national industry which it would be the height of folly to scrap. To do so would not lessen armament production in the world, but merely drive it into other countries. Mr. J. H. Thomas, M.P., the Dominions Secretary, referred to this matter in a speech at Retford on December 8, 1933, in which he said :—

> We are alone as a nation in our method of licensing export of arms. We are almost alone in refusing to give export credits for the sale of arms. In both these efforts to show our anxiety for peace we are running considerable risks. Firms are closing down in this country, and yet armaments are being piled up. Is it any consolation to the British working man, skilled engineers who are out of work, not because their sacrifice is in the cause of disarmament, but because other nations are doing what we are refusing to do ? Is it any consolation to our people to find firms like that of Skoda, in Czechoslovakia, increasing their dividends from 5 per cent. to 28 per cent., while some of our firms are in the hands of the Official Receiver ? No amount of platitude or abuse will get over these facts, and it is time the working classes knew them.

Of the two articles already mentioned, one deals with the present situation in regard to the British warship building resources, and is by a writer in close touch with the industries and callings affected ; the other reveals some of the new difficulties to be overcome in the building of a cruiser from the naval architect's point of view, and is by Mr. J. H. Narbeth, a late Assistant Director of Naval Construction. Incidentally, he refers to the manner in which the cost of a cruiser is distributed widely in wages over the manufacturing districts. The other special articles in the Naval Section follow the lines of earlier years. Our thanks are due to Captain Edward Altham, Mr. G. H. Hurford, and Captain A. C. Dewar, who have again undertaken the surveys of Foreign Navies, Comparative Naval Strength, and the Disarmament Conference. The facts and statistics they bring together will be found a source of enlightenment in the discussions which lie ahead. In continuation of the series on personnel, Captain R. L. Burnett, Director of Physical Training and Sports, describes (with the permission of the Admiralty) the work of this interesting and important branch.

In the Merchant Shipping Section, the tradition of "Brassey" as an open forum for the discussion of questions connected with maritime affairs in all countries is maintained by an article on the Netherlands Mercantile Marine by the Assistant Secretary of the

Netherlands Shipowners' Association. It is significant that he refers to the same obstacle as confronts our own shipping industry; that it cannot flourish unless its ships get foreign trade and provide "invisible exports." It is again a pleasure to acknowledge the helpful co-operation of former contributors—Mr. John P. Taylor, who analyses the relative standing of merchant fleets; Mr. Cuthbert Maughan, who reviews the proposals on shipping subsidies submitted to the abortive World Economic Conference; Mr. R. J. Butler, who records progress in Mercantile Marine machinery; the Editor of *Flight*, who describes the advent of new types of marine aircraft; and the anonymous writers "Viator," "Constructor," and "A.M.I.N.A." Attention may be drawn particularly to "Constructor's" timely article on the rejuvenation of ships. The series on the Great British shipping lines is continued by one on the General Steam Navigation Company, and that on notable British ports by one on Liverpool, by Mr. Richard Beynon, who in 1932 wrote on the history of the Cunard Line. The increased use of welding in ship construction raises a number of questions which are discussed by Mr. E. F. Spanner in a chapter on this subject.

We recognise with gratitude the co-operation of Mr. L. T. Carter, R.C.N.C., who by permission of the Director of Naval Construction, has again had charge of the Naval Reference Section and of the profiles and plans of ships. The value of the "Annual" on its reference side is largely due to his thoroughness and painstaking efforts.

Our sincere thanks are also due to the various Government Departments, to the Press Officers at the Admiralty and Air Ministry, to the Naval Attachés of foreign Powers in this country, and to the many authorities and correspondents who have shown their continued goodwill to the "Annual" by supplying or verifying information. Without this continued interest on the part of its numerous friends, some of them of many years' standing, the work could not maintain its high standard and enjoy the prestige which has attached to it for many years as a guide in relation to maritime affairs.

THE EDITORS.

December, 1933.

SUMMARY OF CONTENTS.

A GROWTH of anxiety concerning the strength of the British Navy is noted in the opening chapter, and quotations are given from the speeches of ministers and admirals which reveal the doubts felt as to whether the Fleet is equal to the responsibilities which may be thrust upon it. In a review of matters of personnel it is noted that the project for training under sail has been abandoned. Increased attention to naval defence is to be observed in the Dominions; Australia is formulating a new programme, and India has ordered a new sloop from a Tyneside yard. Notes are given on the important trade protection and coast defence exercises held during 1933.

Captain Edward Altham, C.B., in summarising the progress of foreign navies, declares that the sole results of the Washington and London Treaties have been to cripple the British Navy. New construction, modernisation, and aircraft expansion are all going forward in the United States. Japan, independent of the League of Nations, is pursuing a virile course of her own. France is hoping to launch her first post-War battleship early in 1934. Italy is able to report great progress after ten years of the Fascist régime. Germany evidently means to assert her old independence. Details are given of the progress of the various minor Navies, down to the new forces of Persia and Manchukuo.

Dealing with comparative naval strength, Mr. G. H. Hurford notes that the force to be built under the U.S. Industrial Recovery Act is numerically stronger than the entire Home Fleet of the British Navy, and the sum voted for modernising battleships averages over £3,000,000 per ship, more than their original first cost. In post-War cruisers the British total in 1934 is 19, compared with the United States 23, and the Japanese 25. Any numerical superiority possessed by Great Britain lies in semi-obsolete and obsolete ships. The growth in torpedo craft, both surface and submarine, belonging to Continental Powers is referred to, and also the appearance of new fast coastal motor boats. As regards personnel, it is shown that while the U.S.A. has increased by 60 per cent., and Japan by 74 per cent. over 1914, Great Britain has decreased by 35 per cent.

Captain A. C. Dewar continues the analytical record of the year's work at the Disarmament Conference. He reviews the various steps which led up to the German withdrawal in October, 1933, and shows that the crisis in the Conference demonstrated the danger of pressing disarmament too far. In urging France to disarm we place ourselves in the position of becoming more or less bound to help her in a crisis. "Thus, while increasing the danger of involving ourselves in a European quarrel, we continue to diminish our powers of defence." Captain Dewar also gives a timely reminder that in 1911 we abandoned the traditional policy of waging war primarily by sea. We allowed ourselves to be entangled in the web of a vast

and faulty plan which we did not even know, and bound ourselves to the wheel of a continental war, directly contrary to the principles of our old maritime strategy.

To the series on personnel, which since 1931 has included essays on the medical, accountant, and instructor branches, there is added in this issue one on "Physical and Recreational Training" by the present Director of this Branch, Captain R. L. Burnett, O.B.E. He gives an historical account of the introduction and growth of P. and R.T. as an essential factor in the welfare and efficiency of the modern ship's company, now that the benefits of mast and sail training are gone; and is able to show valuable results of the work.

A chapter with some striking contrasts is that by Mr. J. H. Narbeth, late Assistant Director of Naval Construction, on "The Building of a Cruiser." He traces the increase in power, speed, aircraft equipment, and especially in cost, between the Birmingham of 1914 and the Leander of 1933. The greater calls on accommodation for the personnel and for offices are referred to. Particularly interesting is an analysis of the distribution of the money involved in building a cruiser, which is "virtually broadcast over the manufacturing districts of England, Scotland, Wales, and Northern Ireland." It is satisfactory to have Mr. Narbeth's assurance that British warships are built appreciably more cheaply per standard ton of displacement than in any other country in the world.

In view of the increased call which must be made soon on the warship building resources of the country, an article on this important subject by a writer in close touch with the industries concerned has been included. Whereas warship work in the pre-War period accounted for 25 per cent. of the employment in the shipbuilding world, it is now little more than one-seventh of what it was. Some effects of this decline are pointed out, particularly in regard to labour; the men who built the war fleet are twenty years older, and the entry of apprentices has been only one-tenth of what it was in the decade before the War.

Merchant Shipping Section.

Mr. John P. Taylor, writing on the standing of the world's merchant fleets, notes a substantial decline in the total tonnage, and an increased rate of breaking up ships, although not so rapid as the circumstances demand. He considers the shipping industry will be the healthier for a more vigorous scrapping policy. Only motorship tonnage shows an increase on the registers of the world. Hardly any cargo ships were built during 1933, the output consisting of a few passenger ships, oil-tankers, and vessels for special services. Increased tonnage under the flags of Finland and Panama, more than is attributable to national requirements, indicates that there may be financial advantages to be gained by transference to these flags.

Mr. Cuthbert Maughan, in Chapter IX, reviews the inconclusive proposals on shipping subsidies submitted to the World Economic

Conference, and traces the difficulties which have overtaken British tramp shipping and the remedies that have been suggested, ending with an account of the report of the Tramp Committee of the Chamber of Shipping.

In a piquant essay, " Viator " deals with the question of "Big *versus* Small Ships," and while inclining towards the former he admits that the issue has become very involved, because some of the big fast ships have paid and some of the small slow ships have also paid, even under present conditions. On balance, he shows that the largest and fastest has always had a good run for its money, not so much because it was large as because in order to be fast it had to be large.

Continuing the series on Foreign Merchant Marines, Chapter XI is devoted to that of Holland, in which country the sea tradition is many centuries old. It is by the Assistant Secretary of the Netherlands Shipowners' Association. All sorts of shipping business are represented there, from the liner companies' 70 per cent. of total tonnage to the 0·3 per cent. in the towage and salvage services, the last-named a speciality in which the Dutch seamen are unsurpassed. This chapter notes that the Dutch, like ourselves, are the losers by measures which diminish the requirements for sea-carrying space and prevent economic employment of existing tonnage.

Another series continued from earlier " Annuals " is that on the great British shipping lines ; this year the General Steam Navigation Company, which claims to be the oldest seagoing steamship company in the world, is dealt with. Starting in 1824, with some wooden-hulled steam packets to ply across the Channel, the Company built its first iron steamer in 1836, and six years later Queen Victoria came from Scotland in the G.S.N. steamer the Trident. The War record of the Company's vessels is referred to, and also its pleasure services to the Kent coast.

To the series on notable ports, represented in 1933 by Hull, Mr. Richard Beynon now contributes the record of Liverpool. He traces the historical development from the small fishing haven on the Lancashire side of the Mersey, and describes the constitution of the Mersey Docks and Harbour Board, the maintenance of an adequate channel through the maze of sandbanks in Liverpool Bay, and the growth of the modern dock system. The landing stage, a noteworthy feature of the port, was first built in 1847.

Mr. E. F. Spanner writes as a naval architect on the use of welding in ship construction, in which there has been a very definite revival of interest during recent years. He points out that there is no way of subjecting the hull of a ship to overload working stresses as is common practice in other branches of engineering, and remarks on the difficulty of evolving a single standard of requirement. The question whether or not work to be electrically welded should be permitted to have flame-cut edges is also discussed. The Admiralty have categorically condemned this practice. Mr. Spanner concludes with a word of warning against unnecessary risks in welding progress.

Much interesting detail will be found in the chapter by " Constructor " on the " Rejuvenation of Ships." Cases are given in which ships have been re-engined to increase their speed, or transformed

from coal to oil-burning, and so on. Increase of length so as to reduce resistance is also dealt with, and propellers, streamline rudders, and bilge keels come under review. It is evident that owners, builders, and engineers are keen to bring existing tonnage up to modern standards wherever that can be done economically.

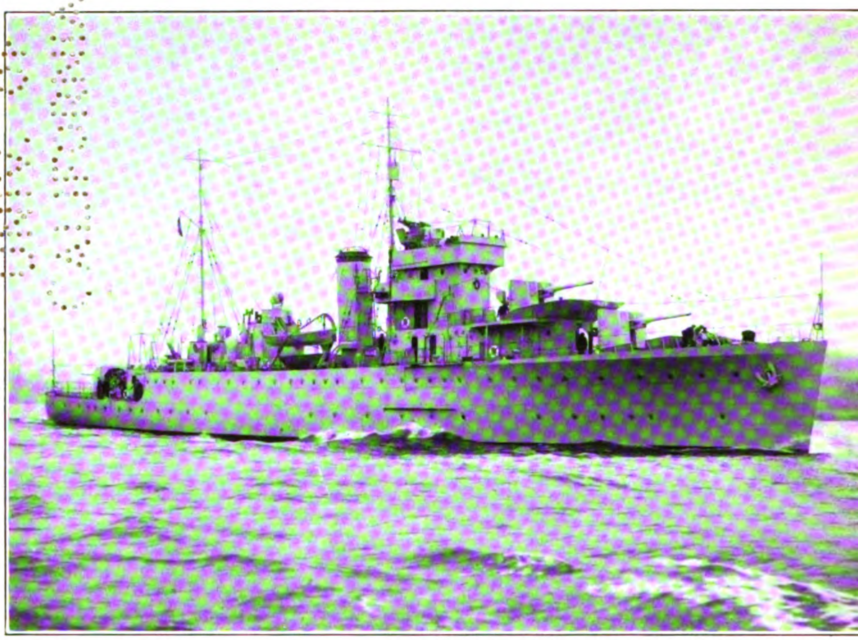
The review of progress in Mercantile Marine Machinery is again contributed by Mr. R. J. Butler, M.I.N.A., who suggests that possibly the outstanding feature of the year was the number of ships for the boilers of which mechanical stokers were being supplied. The initial first cost of pulverised fuel plant still remains too high to warrant its general adoption. A number of ships were converted to super-heating, and there were improvements in reciprocating engines to secure enhanced economy. The horse-power figures of internal-combustion engines under construction nearly trebled in 1933, but even so were only one-half of those of 1931.

According to custom, a chapter is devoted to "Notable Merchant Ships of the Year," and though the year was an extraordinarily lean one in shipbuilding, the author has succeeded in bringing together a remarkable array of interesting vessels. Only one large British ship has to be mentioned, the 22,000-ton Queen of Bermuda, built by Vickers-Armstrongs for the Bermuda and West Indies Steamship Company, associated with Furness, Withy and Co. Other passenger vessels were the motorship Malaita, for the coastal trade of Australia; two motorships for the Hamburg-Amerika Line; the Oceania for the Cosulich Line; and a few American and French ships. New cargo ships, tug boats, fruit carriers, and Channel vessels are also dealt with, nor are some new trawlers overlooked.

In the final chapter of the Merchant Shipping Section, the Editor of *Flight* again deals with progress in marine aviation. He describes the reorganisation which has taken place in the units of the Fleet Air Arm in aircraft carriers, which now work on a squadron basis instead of by flights, and also shows the re-equipment which is being effected gradually in the aircraft allocated to the units. Independent of the Fleet Air Arm are the flying boat squadrons working from shore bases, and for which three new types have been adopted by the Air Ministry—the Blackburn "Perth," the Short "Singapore III," and the Supermarine "Scapa."

Immediately following the British and Foreign Ordnance Tables will be found an important Note on a New Armour-Piercing Shell, in which type of shell special advantages are obtained by a new form of construction of the base end.

NAVAL SECTION.



THE PORTUGUESE SECOND CLASS SLOOP GONCALO VELHO, 1,174 TONS.

Completed, 1933.

THE PORTUGUESE SECOND CLASS SLOOP GONCALVES ZARCO, 1,174 TONS.

Completed, 1933.

(By courtesy of the builders, Hawthorn, Leslie & Co., Ltd.)

CHAPTER I.

Naval Forces of the British Empire.

Nothing has occurred during the past year to lessen the concern and anxiety felt by those acquainted with the state of our naval defence and the bearing this has on the security of the Empire. The risks being run are beginning to be more generally recognised, but unfortunately the sacrifices incurred in order to obtain the naval limitation treaties cannot be made good owing to the operation of those treaties. The Prime Minister told a peace deputation on November 10, 1933, that there was no doubt at all but that if the Government were moved simply by professional ideas the escalator clause of the London Treaty * would have been put into operation eighteen months earlier. This was a significant admission from such a source. Equally significant was the change made in the British naval programme for 1933 and announced by the First Lord in the House of Commons on November 14. Sir Bolton Eyres Monsell said that the policy of building cruisers of comparatively small tonnage had been adopted in the hope that other nations would follow our lead in reducing the size and armaments of cruisers, but the hope had not been realised. If the British programme already approved were carried out our cruisers would be definitely inferior to those now being developed by other Powers.†

Attention was thus directed to the future, and particularly to the expiry of the London Treaty on December 31, 1936. The steps which must then be taken to repair some of the wastage caused by the pursuance over many years of a policy of unilateral disarmament make it essential that preparations should be made now to restore plant and skilled labour dissipated since the War; otherwise, even though the Government may in the last resort be obliged to declare for a large replacement programme, they may be without the means to carry it into effect. The Admiralty may be trusted to look ahead and to endeavour to anticipate the demands which must be made in 1936 upon the producers of war material by measures which will ensure that the organisation and personnel of the shipyards and manufactories are available when required. Furthermore, it may be confidently anticipated that should the circumstances be propitious

* Article 21, which gave any one of the three signatories power to inform the other two that it had to expand its programmes because some non-signatory had engaged in building which really threatened security.

† This change does not involve any increase in the cost of warship construction for the programme of 1933, nor does it alter the position of Great Britain in respect of Article 20, clause (*a*), of the London Naval Treaty, under which the total replacement tonnage of cruisers to be completed prior to December 31, 1936, shall not exceed 91,000 tons.

something in the nature of a Naval Defence Act may be forthcoming, so that the work involved in restoring the Fleet may be regularised, the employment of the workers put on a more consistent basis, and the expenditure spread over a term of years. That some such measure is needed there can be no question, and the only matter in doubt is whether it can await the expiry of the London Naval Treaty.

If, as some ill-informed persons suggest, the mis-called "armament firms" were closed down, a severe blow would be dealt to our staple industries—shipbuilding, machinery, steel, and coal. Hundreds of factories producing auxiliary appliances and the like would be ruined, while the shopkeepers and tradesmen would suffer owing to the reduction in purchasing power. At a moderate computation, somewhere about a quarter of a million persons would be involved in this upheaval, and perhaps half of them might become claimants for State assistance.

The First Lord on the Situation.

The more urgent attention given to the question of naval defence during the year may be indicated by the following quotations from some of the speeches made by various authorities. The First Lord, Sir Bolton Eyres Monsell, made a speech at Barrow-in-Furness on July 29, 1933, in which he showed that not only is the Navy a vital necessity to us, but ours is the only country in the world which is in this position. Sir Bolton said:—

> Every day, 110,000 tons of merchandise and 50,000 tons of food reach our shores from overseas. They come over 80,000 miles of sea routes, and unless we secure their safe arrival we starve. The protection of our sea routes, for the safe arrival of our merchandise and our food, is the business of the Navy. These are facts which our country is too ready to forget.
>
> People complain of the expense of the Navy, which costs about £50 millions a year. But they should remember the value of our overseas trade. In 1925 the value of our overseas trade was over £2,000 millions. The annual cost of our Navy is just about 2½ per cent. of that, and I suggest that 2½ per cent. is not a high rate of insurance for the risks that are covered. Upon our Navy depends the security, the very existence, of the British Empire. If we try to imagine the capital value of the British Empire we must surely feel that the annual expenditure on our Navy is a mere flea-bite. And we should not forget that of that expenditure 90 per cent. goes in wages to skilled craftsmen—men who, if the nation once loses them, can never be replaced.
>
> But it is not only the cost that tends to blind the country to the true value of the Navy. There is the propaganda that says that navies ought to be replaced by universal brotherhood. If this is true the only people who have taken any such step towards universal brotherhood are ourselves, for we have cut our Navy to the bone. But we have had no response from others. Since 1914, we have reduced our naval tonnage by 47 per cent., but in the same period Italy has increased by 20 per cent., the U.S.A. by 29 per cent., and Japan by 37 per cent. It is true that France can point to a small reduction of 10 per cent., but the French Navy of 1914 included much tonnage which for practical purposes was obsolete.

Some remarks made by a Flag Officer are pertinent to the warning given by the First Lord. This officer pointed out that:—

> If air transport between England and Australia were as regular and reliable as sea transport, it would still take over 2,000 freight-carrying aeroplanes to bring the amount of wheat to this country that is carried by one tramp steamer; and whether or not London could be blotted out by bombs and gas from the air, it could without any doubt whatever be starved out in a few weeks if the Navy were inadequate to ensure the arrival of the tramp steamers that bring its daily bread.*

* *Army, Navy and Air Force Gazette*, August 3, 1933.

Even in the depressed trade year of 1932, the declared value of our imports and our exports was £1,119,000,000. The estimates for the naval defence of that vast trade amounted to £53,570,000, or less than 5 per cent. of the trade value.

The main fact which emerges from a review of the events of 1933 is that Great Britain has not merely done more than any other nation to limit her armaments, she stands alone in the process. In a speech in the House of Commons on November 7, 1933, Sir John Simon, the Foreign Secretary, said that, taking the figures of 1914 as a standard of comparison, the personnel of the Navy had been reduced from 152,000 to 90,000. Since 1914 the capital ships of the British Navy had been reduced from 69 to 15; its cruisers from 108 to 54; its destroyers from 216 to 152; and its submarines from 74 to 59; and whereas in 1914 there was the torpedo boat class of 106 vessels it had disappeared entirely. A few days earlier Sir John Simon had shown that "in the effort to set an example Great Britain has reduced her forces to what I call 'the edge of risk.'"

In a further speech in Parliament on November 13, 1933, Sir John Simon said that the net total voted for the Navy in 1914 was £51,500,000, and in 1933 the figure was £53,500,000, but if the Navy Estimates for 1933 were expressed at pre-War rates and prices the figure would be £34,250,000. Thus the actual fact was that there was a reduction of approximately 35 per cent. One of the reasons why there had been on the figures an apparent increase was that the percentage increase in the remuneration of the men of the Navy as compared with 1914 was 114 per cent.

The View of the Navy.

In permitting the decline of our sea power we have sacrificed our best bargaining factor. As Lord Beatty said in his speech at the Trafalgar Day dinner of the Navy League, our statesmen of the past realised very fully the value of sea power as a bargaining factor; though there was a school of thought which recommended isolation, our policy never embraced it, and never in history have we been without allies. To be of value as an ally we must be strong somewhere. We must have something to bargain with, something to make us attractive as an ally. In the past our attraction was the strength of the Navy, which was the handmaiden of our foreign policy. "Without a strong Navy," added Lord Beatty, "we are of no use to anybody, and moreover, we cannot play our part as a great Power."

In opening Navy Week at Portsmouth on August 5, 1933, Lord Jellicoe spoke as follows on the naval situation:—

> We had reduced our Navy by a great deal more than 50 per cent. since the War. Nobody except the Germans, who had to by force, had reduced her Navy, and every other country except France had increased their Navy since the War. We had put forward a gesture which had not been answered, and the time must come when we must stop making gestures in order to return to safety.

A resolution recording its "grave anxiety in regard to the inadequacy of the provisions made for Imperial defence" was carried unanimously at the annual conference of the Conservative and Unionist Associations in Birmingham on October 5, 1933. In moving this resolution, Lord Lloyd said :—

> When the War ended we were the greatest naval, military, and air Power. To-day the Navy was shamefully reduced and our clear naval supremacy had gone. In the air we were certainly only the fourth Power and probably a very bad fifth; yet the leaders of every party had never hesitated to add to the commitments for which we were responsible. . . .
>
> It was no use shamefully pleading with President Roosevelt to stop his building campaign and to get snubbed for our pains. . . . We had given a lead in disarmament, and it was a fine thing to have done; but it was nothing but pure folly to go on disarming when everybody else refused to follow that example.

British Commitments.

Commitments of a serious character have been entered into by the British Government during the last decade always with the object of furthering the limitation of armaments, which it was said could not be secured without such commitments. It is now found that there has been no such general move towards disarmament as was hoped for, but this country is still bound by the agreements made on its behalf. In a speech at Birmingham on October 6, 1933, Mr. Baldwin said :—

> But, and really I apologise for even alluding to this, there is a fear in the world that our country has less regard than she had for the sanctity of agreements entered into since the War which may contribute to the peace of Europe. I say this, and I take the Treaty of Locarno as the most difficult one. What Great Britain has signed she will adhere to. She adhered to her signature with regard to Belgium; her signature to these agreements is sacred.

As to the wisdom or need for entering into such agreements, this is beyond the scope of this article. A vital question is that put by Lord Lloyd in a broadcast address on October 18, 1933 :—

> If we are bound by treaty or otherwise to enter on war, are we prepared and equipped so that our entry can be effective? What virtue is there in proclaiming to the world that we stand by our bargains, knowing all the time that we have not, in fact, the means to carry them out?

The apprehension felt in other ports of the Empire is exemplified by a speech made at the Trafalgar Day commemoration at Adelaide by Sir Edward Lucas, President of the South Australian branch of the Navy League.* He said :—

> Great Britain, by setting a remarkable example in disarmament to the rest of the world, had reduced her naval strength far below her needs. In spite of these reductions, pacifists persistently cried "disarm," and yet the only effect of Great Britain's action had been to lead other Powers to increase their armaments. Without adequate sea power Australia would certainly be lost. Hitherto Australia had been under the sure shield of the British Navy, but it could no longer rely on the same measure of protection.

* *The Times*, October 26, 1933.

I.—THE BRITISH NAVY.

The Capital Ship.

As the time approaches when the " holiday " in the building of capital ships by Great Britain, the United States, and Japan will expire under the London Treaty, the question of the future type of the capital ship becomes of more immediate interest. It may be recalled that Great Britain, the United States, and Japan agreed at the London Conference of 1930 not to exercise their rights to lay down the keels of capital ship replacement tonnage during the years 1931–36. The earliest date, therefore, on which a new capital ship can be laid down is January 1, 1937. A further Naval Conference was contemplated to be held in 1935. Such a meeting, or perhaps even the World Disarmament Conference itself, may produce an agreement affecting the size and power and numbers of the ships which may then be built. That building of some kind must be resumed in the capital ship class is quite certain. The advent of the new German " pocket battleships " of 10,000 tons and 11-in. guns, and of the French Dunkerque, of 26,500 tons and 13-in. guns, makes that clear. There is the further fact that the existing capital ships are wearing out, and so long as the type is regarded as essential to naval power those ships must be replaced.

Even as it is, the state of the Battle Fleet of the Royal Navy is causing some concern. A reference to the subject was made by the First Sea Lord, Admiral Sir Ernle Chatfield, at the annual dinner of the Institution of Naval Architects on April 5, 1933, He said :—

> The Battle Fleet had also been the subject of criticism which had sometimes been misleading. That fleet was getting old. We had agreed at the London Conference that no replacements should be made to the Battle Fleet until at the earliest 1937. That meant that if in 1937 we started a regular naval programme of replacement of the Battle Fleet some of our ships would have to last until they were thirty-six years old. If that was a pleasing prospect to his countrymen it certainly was not to him. There was nothing more expensive or more unsatisfactory than to pour new wine into old bottles, which was what we were continually doing to keep the Navy on its feet.
>
> Some people did not believe in battleships at all and advocated ships of 10,000 tons only, or even of 7,000 tons. Such theories would not stand searching inquiry. They were not believed in by any of the great maritime Powers of the day. The Nelson and Rodney were built because we were invited at the Washington Conference to allow the United States and Japan to keep certain 16-in. gun ships which they had built or were building, and his predecessor, Lord Fisher, was continually blamed for advocating big ships. The principle of going one better, however, had lasted throughout the history of the human race. It was a natural procedure, however wrong, and it could only be checked by international agreement. The one agreement of the Great Powers which he felt would be beneficial was the qualitative agreement, which would reduce the size of ships of all classes. Tactical and strategical interests decided those limits, and the main thing which decided the size of the battleship was the size of the gun. It was essential that the battleship should not be driven off its post by the next strongest weapon, such as the cruiser. If that were to happen, say, in the English Channel, what would become of this country and the British Empire ? The great naval strength of this country was not only the active strength of the Fleet, but also its latent strength. It was on the Battle Fleet that the strength of the country really depended, not only in war but in the counsels of peace.*

The view of the British Admiralty, as has been recorded in earlier

* *The Times*, April 6, 1933.

issues of the "Annual," is that the maximum size of any future capital ship could be reduced to 22,000 tons and the maximum calibre of guns carried to 11 inches. The figure of 22,000 tons represents the minimum which in the view of the Admiralty will give adequate protection, suitable endurance, and tolerably decent living conditions for the personnel.

On the subject of battleships, Lord Beatty, speaking at the Trafalgar Day banquet of the Navy League, said that it is inevitable that the question of replacement of battleships will come before the country in no mistaken language, "for it is on the Battle Fleet that our whole Imperial security must finally devolve." Lord Beatty reminded his hearers that there were two main proposals as regards battleships put forward at Geneva, the Hoover proposal to reduce the numbers of ships by one-third, and the British proposal that the size of the ships should be reduced by one-third. The United States wants large ships, and Great Britain wants many ships, "because our responsibilities on the seas are far greater than those of any other country," added Lord Beatty. He concluded :—

> It is obvious to anybody that we cannot afford our ships to be inferior in fighting power to those of any other country, but I would say this, from the economical side, which is all-important in our minds, that if we can reduce the size of our battleship to a reasonable measure, the expense of our naval armaments will be considerably reduced.

Cruiser Construction.

During 1933 work proceeded, or was planned, on the cruisers of five years' programmes—an indication of the slow rate of construction under post-War methods. The Leander (1929 programme) was completed. The Achilles, Orion, and Neptune (1930 programme) were continued, and the first-named was passed into service. The Ajax, Amphion, and Arethusa (1931), after being deferred for eighteen months in order to effect savings, were laid down in the early months of 1933. Following them closely came the Apollo, Phæton, and Galatea (1932 programme), laid down between June and August, 1933. Lastly preparations were made to begin the three cruisers of the 1933 programme, as yet unnamed, during the latter part of the financial year ending March 31, 1934. No less than thirteen cruisers therefore came within the ambit of the year. The accumulation of work caused by procrastination would give rise to less anxiety if adqeuate appropriations were made towards its cost. The shipyards are certainly capable of a much quicker output. But when funds so limited as those of recent years have to be spread over so many vessels, the rate of progress becomes very slow.

The appropriations for cruisers during the past five years are indicated in the table on the following page.

The estimated total cost of a "Leander" class cruiser is £1,600,000, and of an "Arethusa" class, probably about £1,250,000. Two years after authorisation, therefore, the appropriations have never been more than one-fourth of the entire cost, and sometimes as low as one-tenth of the cost.

Programme.	Ship.	Sums Voted.			
		First Year.	Second Year.	Third Year.	Fourth Year.
		£	£	£	£
1929	Leander	7,678	265,226	622,539	622,908
1930	Achilles	82	326,579	692,566	379,767
	Neptune	1,462	370,690	619,208	594,469
	Orion	1,325	335,287	641,427	569,543
1931	Amphion	1,380	173,713	460,929	
	Arethusa	1,285	155,501	498,692	
	Ajax	15,108	134,565	631,270	
1932	Apollo	——	363,060		
	Galatea	——	329,785		
	Phaeton	——	403,653		
1933	1st ship	690			
	2nd ship	685			
	3rd ship	——			

The Leander, authorised in the Navy Estimates of March, 1929, was commissioned for service in the Second Cruiser Squadron, Home Fleet, on March 23, 1933. There was a delay of eighteen months in laying her keel, due to the London Naval Conference held from January to April, 1930, and the actual building time was 2½ years. An interesting presentation made to the Leander was that of a handsome silver porringer by the members of the Leander Club, Henley. Captain R. R. Turner, D.S.O., received the gift at the annual dinner of the club on March 31, the eve of the University Boat Race. The Leander obtained on her full-power trial a speed of approximately 32½ knots with 72,400 S.H.P.

The three cruisers of the 1930 programme (Achilles, Orion, and Neptune) are identical with the Leander, except that the breadth is increased from 55 ft. 2 in. to 55 ft. 8 in. They have also been allocated to the Second Cruiser Squadron. The Achilles was commissioned with a navigating party at the Birkenhead works of Cammell Laird and Co., Ltd., on October 5, and left next day for the Nore. On October 10 she was completed with a full Chatham crew under Captain Colin Cantile, D.S.C.

The Orion was commissioned on October 16 by Captain C. E. Turle, D.S.O., and was due to be ready for service by January 18, 1934. The Neptune, completing at Portsmouth, is due to be ready for service about two months later. Captain H. R. Moore, D.S.O., Director of Plans, was nominated to command her.

The 1931 cruiser programme felt the full force of the economy drive occasioned by the financial crisis of that year, and no action was taken on this programme until August, 1932, when contracts were allocated, but unaccompanied by a money provision to enable the ships to be begun promptly. The three vessels are of different types. The Ajax, which was ordered from Vickers-Armstrongs, Ltd., and laid down in February 1933, belongs to the "Leander"

class. The Amphion, allocated to Portsmouth Dockyard, and laid down on June 26, 1933, will be of a "modified Leander type," in which modifications have been made in the arrangement of the machinery. The third ship, the Arethusa, of 5,200 tons, will be armed with fewer 6-in. guns than the 7,000-ton cruisers. The Arethusa was laid down at Chatham on January 25, 1933.

The 1932 cruisers, again numbering three as in the two previous years, were subjected to less delay than those of 1931, but were not put in hand until from fifteen to seventeen months after authorisation. Two ships will be of the modified "Leander" type, the Apollo, laid down at Devonport Dockyard on August 15, 1933, and the Phæton, laid down by Messrs. Swan, Hunter and Wigham Richardson, Ltd., Wallsend, on July 8, 1933. The third vessel will be of the "Arethusa" type, named the Galatea. Her keel was laid by the Scotts' Shipbuilding and Engineering Co., Ltd., Greenock, on June 2, 1933.

In the 1933 Navy Estimates, provision was included for four cruisers, the fourth and final instalment of the replacement programme due for completion by December 31, 1936, under the terms of the London Naval Treaty. It was only by including in the 1933 programme the four cruisers which remained to this country under the quota of 91,000 tons inserted in the Treaty that the Admiralty could hope to have them completed by the end of December, 1936. It has become the practice—rather an unfortunate one—to delay ordering the ships of a current year's programme until the end of the financial year, that is, by March 31 of the next calendar year. The 1933 ships will therefore not be started until the early months of 1934, and as has been shown, the usual building time is 2½ years.

An important revision of the 1933 cruiser programme was announced in the House of Commons by the First Lord on November 14, 1933. Sir Bolton Eyres Monsell said that it was decided to include two cruisers of a new type of about 9,000 tons, with increased armament, and one cruiser of the "Arethusa" type, about 5,200 tons, instead of one "Leander" class cruiser of 7,250 tons and three "Arethusas" of 5,400 tons each. Sir Bolton explained the reasons for the change as follows :—

The policy of building cruisers of comparatively small tonnage had been adopted in the hope that other nations would follow our lead.

Also, it will be recalled that in July, 1932, the United Kingdom delegation at Geneva put forward proposals for the reduction of future cruisers to 7,000 tons, with a maximum gun calibre of 6·1 in., in the hope that these would be generally accepted. Unfortunately, neither of these hopes has been realised.

In 1931 Japan laid down two cruisers of 8,500 tons, reported to mount 15 6-in. guns. It is learned that she is now laying down two more of the same dimensions, and that the construction of yet another two (making six in all), is projected.

The United States also have already announced the intention of building four cruisers of 10,000 tons each with 15 6-in. guns.

If, therefore, our programme, already approved, were to be carried out, the new cruisers would be definitely inferior to those being developed by other Powers.

On November 23, the First Lord stated in the House of Commons that the three cruisers of the revised 1933 programme would all be

built by contract, it being clear that the dockyards would have as much work as they could do in other directions.

The 1932 Programme.

The following is the list of vessels authorised under the 1932–33 construction programme, with the names chosen for them, and names of the building establishments :—

Cruisers (modified " Leander " Class) :—

Apollo	H.M. Dockyard, Devonport.
Phæton	Messrs. Swan, Hunter and Wigham Richardson, Ltd., Wallsend-on-Tyne.

Cruiser (" Arethusa " Class) :—

Galatea	Messrs. Scott's Shipbuilding & Engineering Co., Ltd., Greenock.

Flotilla Leader :—

Faulknor	Messrs. Yarrow & Co., Ltd., Scotstoun, Glasgow.

Destroyers (" Fearless " Class) :—

Fearless ... ... Foresight	Messrs. Cammell Laird & Co., Ltd., Birkenhead.
Foxhound... ... ... Fortune	Messrs. John Brown & Co., Ltd., Clydebank.
Forester ... ... Fury	Messrs. J. S. White & Co., Ltd., Cowes.
Fame ... ... Firedrake	Messrs. Parsons' Marine Steam Turbine Co., Ltd., Wallsend-on-Tyne (Hulls, Messrs. Vickers-Armstrongs, Ltd., Barrow-in-Furness).

Submarines :—

Clyde (" Thames " Class) ...	Messrs. Vickers-Armstrongs, Ltd., Barrow-in-Furness.
Salmon (" Swordfish " Class) ...	Messrs. Cammell Laird & Co., Ltd., Birkenhead.
Grampus (" Porpoise " Class) ...	H.M. Dockyard, Chatham.

Sloops :—

Lowestoft (repeat " Shoreham " Class). ... ... Wellington (ditto)	H.M. Dockyard, Devonport.
Harrier (" Halcyon " Class) ... Hussar (ditto)	Messrs. J. I. Thornycroft & Co., Ltd., Southampton.

Destroyer Depôt Ship :—

Woolwich	Messrs. Fairfield Shipbuilding & Engineering Co., Ltd., Govan.

Gunboat :—

Robin	Messrs. Yarrow & Co., Ltd., Scotstoun, Glasgow.

Boom Defence Vessel :—

Aldgate	Built by contract. Hong Kong.

Tender for Submarine Depôt, Portland :—

Elfin	Messrs. J. S. White & Co., Ltd., Cowes.

Tender for Torpedo School, Devonport :—

Redwing	Messrs. J. S. White & Co., Ltd., Cowes.

Destroyers.

The flotilla leader Duncan and eight destroyers of the " Defender " class, authorised in the 1930 programme, were commissioned for service in the First Flotilla, Mediterranean, between November 8,

1932, and April 5, 1933. The actual period of construction was about eighteen months. In design the vessels were replicas of the "Kempenfelt" and the "Crusader" class in the previous year's programme.

The vessels of the 1931 programme received names with the initial "E." The leader, Exmouth, was the only one of this flotilla built in a public yard. She was laid down on May 16, 1933, at Portsmouth. Of the destroyers, the Electra and Encounter were laid down by Messrs. Hawthorn, Leslie and Co., Ltd., Newcastle-on-Tyne, on March 15, 1933. The Echo and Eclipse were laid down by Messrs. Denny and Brothers, Ltd., Dumbarton, on March 20 and March 22, 1933. The Esk and Express were laid down by Messrs. Swan, Hunter and Wigham Richardson, Ltd., Wallsend-on-Tyne, on March 24, 1933. The Escapade and Escort were laid down by Messrs. Scott's Shipbuilding and Engineering Co., Ltd., Greenock, on March 30, 1933.

The vessels of the 1932 programme were put in hand about four months after those of 1931. The Faulknor was laid down by Messrs. Yarrow and Co., Ltd., Scotstoun, on July 31, 1933. Of the destroyers, the Forester and Fury were laid down by Messrs. J. Samuel White and Co., Ltd., Cowes, on May 15 and May 19, 1933, respectively. The Fame and Firedrake were laid down by Messrs. Vickers-Armstrongs, Ltd., as sub-contractors to the Parsons' Marine Steam Turbine Co., Ltd., who are building the machinery, in July, 1933. The Fearless and Foresight were laid down by Messrs. Cammell Laird and Co., Ltd., Birkenhead, on July 17 and July 31, 1933. respectively. The Foxhound and Fortune were laid down by Messrs. John Brown and Co., Ltd., Clydebank, on July 25 and August 21, 1933, respectively.

Submarines.

An outstanding event in regard to new submarines during the past year has been the successful trials of H.M.S. Thames. This vessel, designed by Sir Arthur Johns, K.C.B., C.B.E., Director of Naval Construction, was authorised in the 1929 programme, and laid down in January, 1931, by Messrs. Vickers-Armstrongs, Ltd., Barrow-in-Furness. She is larger and faster and more heavily armed than the submarines of earlier post-War programmes. Details are as follow :—

Length ...	345 ft.
Breadth ...	28 ft.
Displacement (surface) ...	2,165 tons
Displacement (submerged) ...	2,680 tons
Engine output (supercharged) ...	10,000 b.h.p.
Corresponding surface speed ...	22½ knots
Revolutions (maximum) ...	405 per min.
Number of cylinders, each engine ...	10
Cylinder diameter ...	21 in. (533 mm.)
Piston stroke ...	21 in. (533 mm.)
Draught of water ...	13½ ft.
Armament ...	1 4·7-in. gun 2 smaller guns 6 torpedo tubes
Oil fuel capacity ...	224 tons.
Cost (including £1,800 for guns) ...	£519,205

H.M. DESTROYER DARING, 1,375 TONS.

Commissioned for Service, December 1, 1932.

H.M. DESTROYER DECOY, 1,375 TONS.

Commissioned for Service, April 4, 1933.

(By courtesy of the builders, J. I. Thornycroft & Co., Ltd.)

The general design of the machinery of the Thames was produced at the Admiralty, after experimental work at their engineering laboratory, but the contractors undertook the detailed design and applied to it their unrivalled experience of many years in submarine construction. The official sea trials were completed with entirely satisfactory results. Everything worked smoothly, and the machinery was opened out afterwards in good condition. The performance of the vessel was such as to enable the service full power to be assessed at the figures given with every expectation that this power can be obtained readily on service whenever required.

By way of comparison, it may be pointed out that the speed of the Thames is five knots faster than that of the " Odin," " Parthian," and " Rainbow," types, which preceded her. The rate of 22½ knots compares with 21 knots credited to the U.S. submarine Bonita; 21 knots of some of the Japanese " I " class submarines; and 18 to 19 knots of the fastest French and Italian submarines.

The three submarines of the 1930 programme were of two types. The Starfish and Seahorse, laid down at Chatham Dockyard in September, 1931, are similar to the Swordfish and Sturgeon of the previous programme—small submarines of 640 tons (935 tons submerged), with speeds of 13¾ and 10 knots respectively, and each armed with one 3-in. gun, one smaller gun, and six torpedo tubes. The Seahorse was launched on November 15, 1932, and the Starfish on March 14, 1933. They were completed in September and October, 1933, respectively, for service in the 6th Flotilla, Portland. The Porpoise, the other submarine in the 1930 programme, is a minelayer, but is also armed with a 4·7-in. gun. She arrived at Portsmouth on April 25, 1933, from the Barrow works of Vickers-Armstrongs, Ltd., and was attached to the 5th Flotilla, Portsmouth, forming part of the submarine training establishment.

The 1931 programme corresponded to that of 1929, and included one large vessel of the " Thames " class, H.M.S. Severn, and two of the small " Swordfish " class, the Sealion and Shark. The Severn was ordered from Vickers-Armstrongs, Ltd., and laid down by them at their Barrow works on March 27, 1933. The Sealion was laid down at Chatham Dockyard on May 16, 1933, and the Shark, also at Chatham, was laid down on June 12, 1933.

The 1932 programme was made up of three distinct types. The Clyde, laid down by Vickers-Armstrongs, Ltd., at Barrow on May 15, 1933, will be of the " Thames " class; the Grampus, allocated to Chatham Dockyard, will be a minelayer of the " Porpoise " type; and the Salmon, laid down by Cammell Laird and Co., Ltd., Birkenhead, on June 15, 1933, will be of the smaller " Swordfish " type.

Sloops.

The construction of the small and useful " sloop " class also felt the effect of the 1931 stoppage for the sake of economy, and although this type of vessel is urgently required for the replacement of worn-out units of War design abroad, no ship was laid down at all during 1932. The four of the 1930 programme, laid down in 1931, were

commissioned for service, the Falmouth on October 25, 1932; the Milford on December 20, 1932; the Weston on February 21, 1933; and the Dundee on March 23, 1933. From the last-named date an interval of about fifteen months will elapse during which no new sloops will be passed into service. The interval has been utilised for developments in design, and the four sloops of the 1931 programme are of two types. The Grimsby and Leith, laid down at Devonport Dockyard on January 23 and February 6, 1933, respectively, will be of an improved type upon the "Shoreham" class, with a 4·7-in. gun each instead of a 4-in. gun. The displacement will, however, be slightly less—1,060 tons as compared with 1,105 tons. The two others will be sloop-minesweepers of a new class, and have been named the Halcyon and Skipjack, after the pre-War torpedo gunboats which were first adapted for minesweeping. An order for these two vessels was placed with Messrs. John Brown and Co., Ltd., Clydebank.

The Grimsby and Leith are due for completion in May and July, 1934, and are to replace the Cornflower in China and the Veronica in New Zealand respectively. The Halcyon and Skipjack should be completed about the same time, and will be retained for minesweeping service in home waters.

The four sloops of the 1932 programme include two of the repeat "Shoreham" type, the Lowestoft and Wellington, laid down at Devonport Dockyard on August 21 and September 25, 1933, respectively; and two more of the "Halcyon" type of minesweeping sloop, the Harrier and Hussar, ordered from Messrs. J. I. Thornycroft and Co., Ltd., Woolston.

The 1933 programme includes three sloops, one convoy sloop and one coastal sloop. The contract for the convoy sloop was placed early in October, 1933, with Messrs. John Brown and Co., Ltd., Clydebank. This vessel will be named the Bittern. The contract for the coastal sloop was given, in November, 1933, to the Fairfield Shipbuilding and Engineering Co., Ltd., Govan, and the vessel will be called the Kingfisher.

River Gunboats.

H.M.S. Sandpiper, authorised in the 1931 programme, was ordered in April 1932 from Messrs. J. I. Thornycroft and Co., Ltd., Woolston, and laid down in August 1932. The vessel was shipped in sections from Southampton in February 1933, and was completed for service at Shanghai in August. The Sandpiper is of 185 tons—the smallest of the post-War river gunboats—and with engines of 600 horse-power she has a designed speed of 11¼ knots. Her armament includes one 3·7-in. howitzer and nine smaller guns. She left Woosung for her first cruise up the Yangtze on September 5, 1933.

H.M.S. Robin, ordered in January 1933, under the 1932 programme, from Messrs. Yarrow and Co., Ltd., Scotstoun, was laid down on April 8, 1933.

The 1932 programme included a destroyer depot-ship to replace the Sandhurst, depot-ship of the Mediterranean Flotillas, which is

thirty years old and approaching the end of her effective life. The new ship will be called the Woolwich, after the former destroyer depot-ship which served throughout the War and was scrapped in 1926. The contract was placed in May, 1933, with the Fairfield Shipbuilding and Engineering Co., Ltd., Govan.

Netlayer and Target-Towing Ship.

H.M.S. Guardian, netlayer and target-towing ship, built under the 1930 programme and of which a description was given in the "Annual" last year, was commissioned for trials on February 23, 1933, and completed in June. On July 17, she arrived at Rosyth for special trials, and on their conclusion was to replace the Snapdragon in the Home Fleet.

Miscellaneous.

The specialised character of the modern Naval Service is reflected in the number of special vessels for harbour service which, even in a time of financial stringency, have had to be provided. During the financial year ended March 31, 1933, Portsmouth Dockyard completed two harbour service fuelling tugs for Malta, a mining lighter, and a cable lighter. The yard also built the Skylark, tender for the Mining School, of 270 tons, 400 horse-power, and 10 knots speed, at a cost of £32,480.

The Bishopsgate, boom defence vessel, built under the 1931 programme by Messrs. Henry Robb, Ltd., Leith, was completed in December 1932, and stationed at Rosyth. The Bishopsgate is of 290 tons, 93 ft. long, and carries one 4-in. gun. A sister ship, the Aldgate, built under the 1932 programme, is building at Hong Kong. These craft cost about £25,000 each.

The Elfin (tender for the Submarine Depot, Portland), and Redwing (tender for the Torpedo School, Devonport), were ordered under the 1932 programme from J. Samuel White and Co., Ltd., Cowes. They are sister ships of 225 tons, 102 ft. long, and 25 ft. broad, with engines of 950 h.p. giving them a speed of 9½ knots. The Elfin is estimated to cost £18,728 and the Redwing £16,708.

The Fleet Air Arm.

A change in the organisation of units of the Fleet Air Arm was made with effect from April 3, 1933. Formerly the organisation was by flights, the normal number of aircraft per flight being six. Organisation by squadrons of twelve or nine aircraft was introduced in place of this. Nos. 402 and 404 Flights became No. 800 Squadron (twelve aircraft), in H.M.S. Courageous; No. 401 was brought up to an establishment of nine aircraft by the absorption of half of No. 405 Flight, and became No. 801 Squadron, in H.M.S. Furious; and so on. Organisation by squadrons was not, however, introduced for units providing aircraft for operation from cruisers or capital ships.

The aircraft carriers Courageous and Furious, from the Home

Fleet, the former flying the flag of Rear-Admiral R. G. H. Henderson, C.B., met the Glorious, of the Mediterranean Fleet, in January, and the three vessels worked in company until March.

The fitting of capital ships and cruisers with catapults has continued, and some eighteen vessels were so equipped at the end of 1933. This method of aircraft operation, it has been suggested, may eventually supersede the use of land machines operated from carriers, but the two schemes are complementary rather than competitive. A seaplane catapulted off a battleship or cruiser has to be specially strengthened, and the launching gear especially contrived, otherwise damage is caused from the shock of the vessel's own guns. The aircraft, too, mounted on the catapult, is in an exposed position to wind and weather, whereas in a carrier the machines are housed comfortably in hangars below deck, and are of course much more numerous.

Aircraft carriers are admittedly costly to maintain and are very vulnerable, yet without them the range and resources of the aircraft working with the Fleet would be seriously curtailed. The eventual solution of the problem may be found in the use of large flying boats, self-contained and able to keep the sea for long periods; but this will not be until further development has taken place, and meantime all flying boats are under Air Ministry, and not Admiralty, control.

The King's approval was given in June for alterations in the position in which the badge for officers serving in the Fleet Air Arm is worn with white uniform. If no medal ribbons are worn, the badge is placed 1½ in. above the left breast-pocket. If medal ribbons are worn, it is placed immediately above the top row. It was formerly worn in the centre of the left sleeve. The badge consists of a silver anchor and cable, superimposed on the wings of an albatross in gold. With white uniform, a badge with a safety-pin attachment is worn.

The Flag List.

The problem of facilitating advancement to flag rank at an early age, while at the same time retaining on the flag list officers of experience whose services may be needed, continues to prove a difficult one. In his speech on the Navy Estimates on March 16, 1933, Sir Eyres Monsell, the First Lord, said on this matter :—

> Last year I had to give the House a very gloomy picture of the prospects of promotion for everybody in the Navy, owing to the great block at the top of the flag list. The captains who were being promoted to rear-admiral were getting too old; the age was getting up too high. I am sure that the House will realise the importance of getting young and active admirals promoted to the flag list. Further than that, however, the captains' list was getting so swollen that we actually had to foresee a time when it might be impossible for a year or half a year to promote any commanders to captain. If we had had to do that, it would have been a perfectly heartbreaking situation for junior officers in His Majesty's Navy. So I am glad to say to-day, a year afterwards, that the situation has changed entirely for the good. It is very surprising that the situation could have changed so quickly in a year's time. The improvement is almost entirely due to the voluntary retirements of six admirals, who gave up willingly their hopes and chances when they saw what a very bad state things were in with respect to promotion. They gave up these hopes and chances in order to facilitate the flow of promotion of junior officers. I hope that they will reap their reward for their unselfish, public-spirited, and high-minded action when they see the

result that they have been successful in bringing about. The first result is that captains are now, only a year afterwards, promoted to rear-admiral with fourteen months' less seniority than they had. But, far more important than that, instead of foregoing a half-yearly batch of promotions from commander to captain, we have increased the number of promotions by approximately 25 per cent., and I have every hope and belief that that increase will continue. Of course, this is a great encouragement to junior officers.

The extent of the improvement referred to by the First Lord may be judged by a comparison of ages. When he spoke in March, 1932, the last two officers promoted to rear-admiral and retained on the active list of that rank were 52 years 11 months and 52 years 4 months old respectively. When he spoke in March, 1933, the last four officers promoted and retained were 51¼, 49¼, 49½, and 51¼ respectively. The average age of the 11 who had been promoted and retained during the year was well under 50. Promotion to flag rank before an officer reaches the age of 50 is very desirable if he is to gain experience in the rank and be of service to the Navy at a reasonable age. A rear-admiral at 50 means a vice-admiral at about 55 and an admiral at about 59. It will be found on comparison that the leaders during the War were younger than this. Excluding the exceptional case of Lord Beatty, who was a rear-admiral at 39, it will be found that Sir Roger Keyes was a rear-admiral at 44, Lord Jellicoe and Lord Wester Wemyss at 47, Sir Charles Madden at 48; and Sir Doveton Sturdee, Sir Michael de Robeck, and Sir Reginald Tyrwhitt at 49.

The problem has many aspects, and requires careful handling. Sir Bolton Eyres Monsell announced in March, 1932, a decision to curtail employment at the top of the officers' list to the extent necessary to ensure an adequate number of vacancies in the interest of officers generally. This was followed by the selection of a junior vice-admiral to be Commander-in-Chief at Plymouth, and by the voluntary retirement of the six admirals referred to. Unfortunately, occasion may arise when there is need for an officer of age and experience, an instance of the kind being the recall from half pay of Admiral Sir John Kelly, after commanding the Naval Reserves, to be Commander-in-Chief of the Home Fleet in the difficult circumstances in October, 1931. Had Sir John retired voluntarily on leaving the Reserves Office (which is usually regarded as a final appointment) his services would not have been at the disposal of the Board when they were needed. Here, then, is the crux of the problem; you cannot retain older and experienced officers and at the same time facilitate the advancement of younger ones with keenness and initiative. A hard-and-fast rule in either direction would be harmful to the Service, and the position, changing as it does from month to month, must always be reviewed on its merits.

Captains' Promotion on Retirement.

With reference to the orders issued in October, 1931 (see the "Annual," 1932, page 14), concerning the retirement in their existing ranks of captains, engineer captains, and captains (E), and surgeon captains whom it has been decided not to employ in higher ranks,

a concession has been made concerning the point at which the new rules are to apply. The Admiralty have decided that the revised regulations, by which the grant of steps in rank on or after retirement is discontinued, should not be applicable to officers who were on the list of executive captains at the date of that order. Consequently the new rules will apply "to captains promoted to that rank after October 7, 1931, instead of to captains of seniority 1926 and below." The change affected upwards of 100 captains promoted between 1926 and 1931, all of whom, providing they get in the requisite sea time, can now reach the rank of rear-admiral.

Retired Officers' Employment.

An Order in Council published in the *London Gazette* on October 13, 1933, altered the terms on which retired officers may serve if re-employed. Normally a retired officer, if promoted on or after the termination of his service on the active list, receives the rate of pay of the higher rank if recalled to service in emergency. His retired pay is suspended during re-employment, but a bonus at the rate of 15 per cent. on the gross full pay earned, exclusive of allowances, is issuable, in consideration of the fact that the time served did not count for increase or grant of retired pay. By Order in Council dated October 9, 1933, provision is made for the voluntary re-employment of retired officers for service in, and with the pay of, the last rank held by them on the active list, but without the bonus. The conditions are as follows :—

(1) To receive the full pay and allowances of the rank last held on the active list.

(2) Deductions to be made from such full pay equal to the amount of retired pay commuted, if any, or to the annual value of any gratuity awarded on retirement.

(3) Retired pay to be suspended during re-employment.

(4) Service to be in the rank last held on the active list, and any higher rank held by an officer on the retired list to be in abeyance during re-employment.

(5) Such further service not to count for increase of retired pay.

The foregoing conditions to be without prejudice to the application of those prescribed by Order in Council dated July 4, 1895, when deemed appropriate.

The new order, it is officially announced, does not affect the conditions of service of retired officers when called up in time of war or national emergency.

Retiring Surplus Lieutenant-Commanders.

On August 5, 1933, a statement was issued by the Admiralty in regard to the number of senior Lieutenants and Lieutenant-Commanders in excess of requirements. The schemes for clearing the lists in these ranks have been described in past issues of the "Annual." "To bring about the necessary reductions," said the statement referred to, "great efforts have been made to enable officers to retire voluntarily without undue hardship, but have failed to produce the necessary number of retirements. Consequently, with the greatest reluctance, the Admiralty have been obliged to inform a certain number of officers that they can no longer be given further employment. During the present year this number is 57."

Up to October 31, 1933, a total of 123 Lieutenant-Commanders and Lieutenants had taken advantage of the special scheme for the retirement of surplus officers instituted in February, 1931. The seniorities concerned were as follows:—Lieutenant-Commanders of 1923, 13; 1924, 20; 1925, 12; 1926, 10; 1927, 10; 1928, 11; 1929, 6; 1930, 5; 1931, 18; 1932, 1; and 1933, 1. Lieutenants: 1923, 8; 1925, 1; and 1926, 7.

Accountant Branch Promotions.

In view of there being no retirements of paymaster-captains for age during 1933, special approval was given for two promotions to that rank to be made each half-year in 1933. These officers are additional to establishment and will be absorbed into the establishment as officers are placed on the retired list in 1934 *et seq.* Officers promoted subsequently will similarly commence their service as paymaster-captains as "additional" officers until all are gradually absorbed by January 1, 1936. Until absorbed in the establishment of paymaster-captains, such "additional" officers will be entitled to all the privileges of their substantive rank, except that during employment they will receive pay as paymaster-commanders, unless holding an appointment for which the rank of paymaster-captain is authorised by complement, and during periods of unemployment they will receive unemployed pay or half-pay as paymaster-commanders.

Entry of Cadets.

A lowering of the age of entry of cadets from the public schools is being brought about gradually. The object is to enable these special entry cadets to become commissioned officers at an earlier age. The former age limits were 17½ to 18½ years. For the examinations in June and November, 1933, candidates who were between 17 and 18½ were allowed to compete. For the examination in June, 1934, and subsequent examinations, the age limits will be 17 to 18. The change gave rise to some criticism that the withdrawal of a boy from his school at the lower age deprived him of the best part of his training there—his fourth year, during which he had risen to a position of responsibility in the school life and had acquired balance and judgment. On the other hand, against any disadvantage in this respect must be set the earlier experience obtained as a cadet, experience now afforded in a seagoing cruiser, the Frobisher, instead of a harbour ship.

The Frobisher made three cruises during 1933, each lasting about three months: a spring cruise to the West Indies, summer cruise to the Baltic, and autumn cruise to the Mediterranean. A correspondent who visited her on her return to Sheerness from the first cruise wrote in the *Daily Telegraph* on April 7, 1933: "I was astonished at the change in the appearance of these youngsters. When I saw them mustered on the quarter-deck last January, just before the ship sailed, most of them were obviously feeling the cold,

and certain of their number did not look too robust. To-day they are all sturdy and well set-up, their faces deeply tanned by tropical sun and wind. They have, in fact, suffered a 'sea change,' and the difference is amazing. Judging from the experience of this voyage, the Admiralty's decision to commission H.M.S. Frobisher as a cadets' training ship has been completely justified."

The Future of Dartmouth.

The question of the maintenance of the Naval College at Dartmouth, and the cost of the establishment in relation to the numbers trained, have been the subject of discussion during 1933. The First Lord was able to say, when speaking on the Navy Estimates on March 16, 1933, that the cost of Dartmouth had been reduced by 20 per cent. The chief reason for the high cost is the necessity of a dual staff—a naval staff and an instructional staff. The economies had been effected in both. The first six terms at Dartmouth have been combined for instructional purposes, so that there are bigger classes and fewer instructors.

The Admiralty have been considering whether it would not be desirable to open Dartmouth College at a suitable fee to a limited number of boys who do not intend to make the Navy a career. Many parents have said that they would like their sons to get the exceptional advantage of the education at Dartmouth so long as it was not necessary for them to make the Navy a career, and the suggestion is made that the opening of the College to this class of boy would lessen the overhead charges, which are somewhat high, because the College was built for a larger number of cadets than are now trained there. The general feeling appeared to be that a half-measure of this kind would be bad for the *bona fide* naval students.

The grounds on which Dartmouth is retained as the main avenue of entry to the commissioned ranks are two. One is that it inculcates the naval tradition at an early age and therefore produces better naval officers than the public schools; the other that if relied upon entirely the public schools would not produce sufficient candidates for cadetships. The first is disputed by many naval officers, and expression to their view was given by Vice-Admiral Gordon Campbell, V.C., in the debate on March 16. "My own experience," he said, "having commanded both Dartmouth cadets and public-school cadets, leaves me no hesitation in saying that public-school cadets make better officers than Dartmouth cadets. The initial training is far superior." The second point, in regard to numbers, rests upon a vague prediction which hardly bears examination, according to the advocates of the special entry system. If all schools knew that this was to be the principal channel, and that the vacancies would be much more numerous than at present, they would probably co-operate to ensure that there was no dearth of the right material. According to the published lists, exactly 100 cadets were taken into Dartmouth during 1933—38 in the

January entry, 30 in May, and 32 in September. The number accepted through the special entry was 34, made up of 10 executive and 5 engineering cadets in January, and 13 executive and 6 engineering cadets in September. About 8 cadets were also accepted for direct entry from the Mercantile Marine training establishments.

Training under Sail.

The suggestion that a sailing ship or ships should be built for training purposes has been dropped. Apart from the question of the cost of such a vessel which would have no war value, it was found that there was great diversity of opinion among the senior officers of the Navy in regard to this form of training. The First Lord, who made the suggestion a year previously, referred in his Estimates speech on March 16, 1933, to the many practical objections which had been advanced, and to which he could only oppose "the arguments of a visionary." He added that the real question was this: the re-introduction of sail training in the Navy would be a radical change. If it is to be a success, it must not merely have acquiescence: it must be adopted with enthusiasm; and if it is not going to be adopted with enthusiasm it is better not to have it at all.

The project raised great hopes among many officers. Some gave up their leave to go as hands in foreign sailing ships, because they could not get into British sailing ships, in order to train themselves for what they thought was coming. One group of young officers from China acquired a small sailing vessel in which to return home via the Pacific and Panama Canal, and the Admiralty in approving of their venture decided that their leave should start from the date of arrival in England.

A sidelight on the conditions which led to the proposal for sail training was contained in Fleet Orders on March 24, 1933. A recent refusal of a seaman to obey an order to go aloft indicated that there might be some seamen who did not fully understand that it was their duty to go aloft when required to do so. For that reason, the Board desired it to be made plain "that to go aloft is part of the duty of every seaman."

Engineer's Sea Training.

In keeping with the policy of the Admiralty, since Sir Eyres Monsell became First Lord, to give more sea time to junior officers, the period of training of engineer officers at the R.N. Engineering College, Keyham, is being reduced. Cadets who entered Keyham in September, 1931, and subsequently, will stay there for eleven terms instead of twelve. From April, 1935, when the first batch of officers to complete their training in eleven terms passes out, all officers will serve at sea as sub-lieutenants (E) until, at earliest, they have obtained their engine-room watch-keeping certificates. They will be advanced subsequently to the rank of lieutenant (E) according to the promotion marks gained, the seniority being ante-dated where necessary.

This change removes the somewhat anomalous feature from the early service of engineers, that officers might serve in the Navy for ten years, and be confirmed in the rank of lieutenant, without ever going to sea. Before the War, the system was for the future engineer specialists, in common with those for other branches, all to serve at sea until after they had obtained their watch-keeping certificates and become lieutenants. Since the War, cadets who chose engineering have on the conclusion of their four years at Dartmouth gone direct to Keyham College and the Vernon Torpedo School for a further four years' technical training. This was followed, in the case of a selected few, by the advanced engineering course at Greenwich, lasting two years—a total of ten years in shore establishments.

Specialists and Sea Experience.

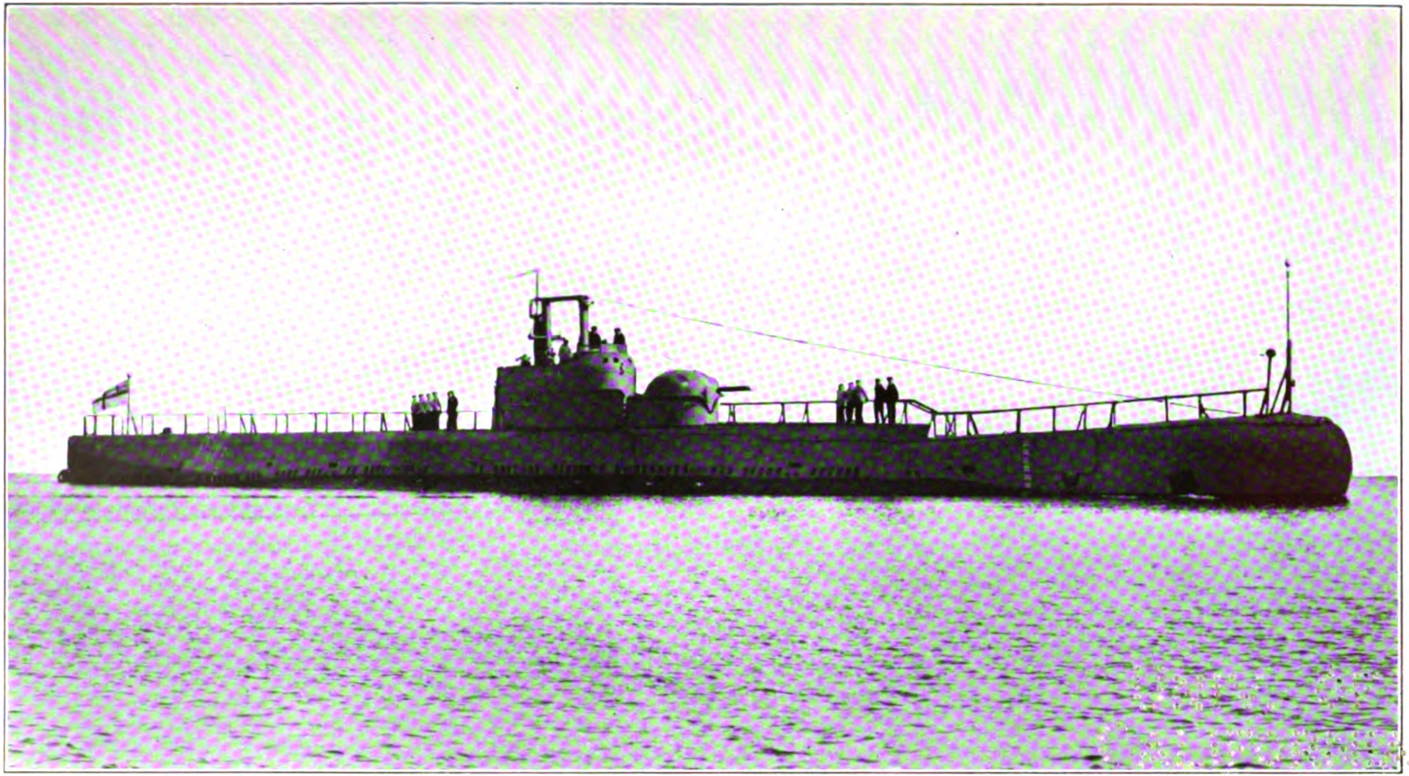
The question of the amount of general service experience afforded to specialist officers under the conditions of late years was referred to in the last issue of the "Annual." A further decision of the Board was promulgated on February 17, 1933, with a view to giving such officers as much sea experience as possible. The Board decided that specialist officers are to be given a sea appointment as soon as possible after completing the qualifying course. G., T., and S. officers will not normally be appointed to an advanced course immediately after completing the qualifying course.

Precedence of Officers.

Their Lordships have decided that the practice of introducing officers in the order given in the Navy List on occasions of ceremony, official inspections, etc., is to be modified. In future, officers are to be introduced in the following order: (1) The Second in Command of the ship; (2) Commissioned Officers being Heads of Departments, in order of seniority; (3) the remaining officers, in Navy List order. Staff officers, borne additional, will be presented as the Flag or Commanding Officer considers desirable. The order in which officers are shown in the Navy List remains unaltered.

Officers and Language Study.

Early in the past year the Admiralty were pleased to note a marked increase in the number of officers who had volunteered for study in foreign languages, but they pointed out that the number of officers qualified as interpreters was still insufficient to meet requirements. Officers who had passed the preliminary examination and who were unable to proceed abroad for study were reminded that they might apply to continue their studies under K.R. and A.I., Article 368A. Volunteers are required for the study of the following languages in the order stated: Dutch, Modern Greek, Japanese, Russian, the Scandinavian languages, Portuguese, Italian, German, Spanish, and French. Arrangements can be made for only a very small number of officers to undertake full-time study of



H.M. SUBMARINE PORPOISE, 1,500 TONS.

Completed, April, 1933.

(By courtesy of the builders, Vickers-Armstrongs, Ltd.)

Arabic, Russian, and Japanese. Every possible facility and encouragement is therefore to be given to officers who are prepared to study these languages in their own time under the Article of the Regulations referred to.

Travelling Concessions.

Some concessions in travelling made since the last issue of the "Annual" have proved a boon to many of the younger married officers. The railway companies (with the exception of the Irish and the London Tube, District and Metropolitan Railways) agreed to issue tickets to naval personnel travelling on duty or on leave at ordinary single fare for the return journey, and at half ordinary single fare for the single journey. The above concessions are available to wives and families of officers and men to whom the former leave travelling concessions applied. The stipulation of a minimum fare of 5*s*. for officers was withdrawn. On June 15, 1933, it was further notified that the railway companies concerned had agreed to the issue of third-class concession tickets when used in connection with leave to R.N. and R.M. officers, irrespective of rank, and to their wives (and children under sixteen years of age when dependent upon and accompanying them). Officers and their families who so wish may continue to obtain first-class tickets at the existing reduced fares. Another concession, notified on July 13, 1933, was that the railway companies had agreed to the issue of tickets at the concession rates to officers travelling to take up appointments from unemployed time or half pay, and to their wives (and children under sixteen years of age when dependent upon and accompanying their mothers) when travelling in connection with such occasions, irrespective of whether they accompany the officers.

Officers' Binoculars.

Representations were made to the Admiralty that the arrangement under which a money grant was made to sub-lieutenants towards the cost of purchasing their own binoculars was unsatisfactory for various reasons. It was therefore decided in April, 1933, to suspend for a period of three years the regulation requiring sub-lieutenants to provide themselves with prismatic binoculars. During this period the supply of binoculars to H.M. ships will be increased for the use of officers who in consequence of this decision are not in possession of their own.

Dependents' Allowances.

A reduction has been made in the age limit up to which dependents' allowances are to be granted. As from November 10, 1932, the normal age limit for the grant or continuance of allowances to daughters and sisters of deceased naval and marine officers is eighteen years (the age limit applicable to sons), instead of twenty-one years. The new rule is subject to the following exception, to which

the former age limit of twenty-one years will continue to apply, viz. allowances (other than those granted on an attributable basis) to daughters of officers who have neither (1) been promoted to higher rank on the active list, nor (2) entered the Service subsequent to the date of the order.

Lower Deck Promotion.

Six acting petty officers were promoted to commissioned rank as acting sub-lieutenants on September 1, 1933, and appointed to the President for their course at the R.N. College, Greenwich. These were the first commissions to be awarded to lower-deck ratings under the scheme of promotion from the ranks introduced in May, 1931, following the recommendations of the Committee of Inquiry under Admiral Sir Frank Larken. Under the new system, candidates have to serve at sea as leading seamen for six months and then appear before a Fleet selection board. Successful candidates then undergo a modified petty officers' course in morale, power of command, and kindred subjects, after which they are interviewed by a final selection board. In 1933, twelve leading seamen were recommended by the Fleet selection boards and discharged to Portsmouth Barracks for training as acting petty officers. They were interviewed at Fort Blockhouse on August 1 by a board presided over by Rear-Admiral Noel F. Laurence, and in the final decision by the Admiralty only one-half of the number were granted commissions.

A Fleet Order was issued on August 31, 1933, drawing attention to the provision in K.R. and A.I. that the selection of boys for accelerated advancement should be governed by their suitability as regards " character, service, self-reliance, physical fitness and capacity to hold their own among the ship's company " in addition to the passing of the qualifying examination. Their Lordships had reason to believe that some commanding officers did not place a sufficiently strict interpretation on the first condition mentioned above. They therefore emphasised that the mere passing of examinations is an inadequate criterion of a boy's worth to the Service, but that when in addition to the educational qualification, a boy possesses the other qualities specified, he deserves every encouragement and assistance to rise in his profession.

The Short Service System.

Both as a means for economy and to help in maintaining the Royal Fleet Reserve, the authorities are making greater use than formerly of the special service system. In August 1933, an Order in Council authorised its extension to the Signal branch, as from July 1, 1933. Men are to be entered as ordinary signalmen at 2*s.* a day, rising to signalmen at 2*s.* 9*d.*, and leading signalmen at 4*s.* 4*d.* a day. These rates are identical with those already in operation for the Telegraphist branch, to which the special service scheme was extended in 1932. All men in the S.S.S. are required to sign for

twelve years, but only seven years are in the Fleet and the remainder in the Royal Fleet Reserve. So far as their length of service permits, they are eligible to obtain non-substantive ratings under the same regulations as continuous service men.

Vocational Training.

Excellent work continues to be performed in connection with the vocational training scheme, and an exhibition of work done by seamen and marines trained in this way formed one of the attractions of Navy Week. A list issued by the Admiralty showed that the courses in Series " A," i.e. those approved to be conducted by local vocational training committees, numbered no less than thirty. The subjects include bricklaying and plastering, pig and poultry farming, gardening, motoring, country house lighting, cinema operating, butler and valeting, barbering, boot repairing, tailoring, food and cookery, marine engineering, acetylene welding, wireless telegraphy, radio communication, and sanitary and meat inspectors. There are other courses, known as Series " B," which are held by municipal technical schools or the International Correspondence Schools.

Captain of Gun.

One of those minor alterations which indicate the changing conditions of service in the Navy was a Fleet Order issued on August 31, 1933, to the effect that the non-substantive rate of Captain of Gun is no longer required, and that the duties performed by these ratings, as No. 1 in 16-in. and 8-in. turrets, might in future be carried out by suitable A. Bs. (S.G.) and Marines (Q.G.) carefully selected at sea. No extra remuneration was to be granted for this duty; the function of charge of loading and gun's crew in these turrets devolves upon the gunner's mate.

The Naval Savings Bank.

The past year has seen the elimination of the Naval Savings Bank after more than sixty years of useful service to the blue-jacket. The bank was established under the Naval Savings Bank Act of 1866, to encourage thrift and the development of a habit of saving. The conditions of the Service do not, however, as the Admiralty now point out, readily admit of the continued practice of saving by means of a Naval Savings Bank account, because the life of a ship's bank is necessarily limited to the period of the commission, and although the regulations permitted the transfer of accounts to the banks at the home ports, the fact that such a transfer was not automatic, but was arranged at the option of the depositor, was liable to result in a break in the practice of saving. Discharge from the Service, or promotion to warrant rank, resulted in yet another break of continuity. The Post Office Savings Bank, on the other hand, is available throughout a lifetime, and with the present facilities for leave naval personnel have sufficient opportunities to

make use of it. But in addition, from March 1, 1933, arrangements have been made with the Postmaster-General for the transaction of P.O. Savings Bank business in H.M. ships and establishments on foreign stations under conditions comparable with those in regard to the Naval Savings Banks. No deposits in the latter have been accepted since February 28, 1933.

Readjustment of Men's Pay.

A readjustment of pay and pensions for certain classes of men in the R.N. and R.M. who had been somewhat inequitably treated in comparison with their comrades by the operation of changes made in the autumn of 1931, was notified on March 17, 1933, in Fleet Orders. These matters were brought to the attention of the Admiralty by the Commanders-in-Chief. It may be recalled that when, at the time of the financial crisis of 1931, it was decided to make a 10 per cent. cut in the pay of the Services the Government further decided to exercise its right to apply new scales of pay and new pension conditions to men already in the defence Services on re-engagement after September 30, 1931. Such men, in addition to being subject to the 10 per cent. cut in pay, have since been required, as they became due for re-engagement, to accept the lower scale of pay introduced in 1925 for men joining the Service after September 30, 1925, and also the lower scale of pension introduced in 1930 for men joining the Service after March 31, 1930. The necessity for re-engagement to complete time for pension led to men having their pay cut twice over, even though they may have been performing the same work. It also resulted in a man, after re-engagement, receiving a lower rate of pay than a man junior to him. The regulations were therefore modified to provide that no man shall be placed on a lower scale of pay than he was actually receiving before re-engagement. The rule that the lower pension scale should apply to all men on re-engagement was made subject to the proviso that the value for pension purposes of service already rendered before re-engagement should remain unchanged. No increase of pay to any one was involved in these decisions. The principle of a 10 per cent. cut was maintained. But additional cuts, which were applicable to the defence Forces alone, and had no counterpart in the measures applied to other Crown Services, were mitigated.

Naval Prize Fund.

The final residue of the Naval Prize Fund was disposed of by the Board of Admiralty in June 1933. A sum of £14,820 was granted for the institution of a scheme for medical assistance to the wives and families of officers and men of the Fleet stationed at Malta. A further sum of £5,964 10*s.* was granted for similar purposes at Gibraltar. The R.N. and R.M. Officers' Civil Employment Committee received a grant of £1,000; and there was a further grant of £3,480 17*s.* 9*d.* to the R.N. Benevolent Trust (Grand Fleet and Kindred Funds).

Submarine M.2.

After several gallant attempts which came very near to success, the salvage operations on the wreck of Submarine M.2, which foundered in the previous January, were abandoned on December 8, 1932. In Admiralty Fleet Orders dated June 8, 1933, it was announced that the reports of the salvage operations had been considered by their Lordships, who had noted with satisfaction and appreciation the manner in which this arduous work was performed by all engaged thereon. Fifteen officers received expressions of appreciation or commendation. Two chief petty officers were awarded the Medal of the Order of the British Empire and a gratuity. Twenty other ratings received advancement, or additional seniority towards it; and twenty-five more had notations of valuable services made on their parchment certificates.

Sisal Cordage.

An interesting decision notified in Fleet Orders dated April 13, 1933, was that to adopt sisal cordage for use instead of manila cordage for 50 per cent. of requirements for towing hawsers and heaving and hauling lines, and entirely for a number of other services, but not for boats' falls. Sisal is cheaper than manila, and has the added advantage of being an Empire product. Trials have shown that it has a higher initial breaking strain than manila.

Royal Naval Reserve.

New rules were notified in Fleet Orders dated April 6, 1933, respecting the rank of Commodore in the R.N.R. and R.N.V.R. The maximum numbers of officers on the active and retired lists who at any one time may hold the rank of Commodore, 2nd class, is: R.N.R., 6; R.N.V.R., 2. Vacancies may be filled by the appointment of captains on the active or the retired lists of the R.N.R. or R.N.V.R. In the promotion list dated June 30, 1933, two captains, R.N.R., and one captain, R.N.V.R., were promoted to the rank of Commodore.

Royal Fleet Reserve.

The conditions of service in, and the scale of gratuities for, the Royal Fleet Reserve, were revised as from April 1, 1933. They applied to continuous service men and Royal Marines joining the Reserve on or after this date; men joining the Navy as special service ratings on or after April 1, 1933; and men serving in the Navy as special service ratings on March 31, 1933, who may be transferred to the Reserve after that date on discharge "free" or "by purchase" from the active service. The principal difference in the conditions relates to gratuities. A new rate of gratuity, £50 on completion of 17 years' qualifying service, was established. The qualifying service required for the gratuity of £75 was raised

from 20 years' reckonable service, and attainment of the age of 40, to 22 years. A further period of 5 years was added to the qualifying service required for the gratuity of £100, making 27 years, and this was made " subject to services being required," the object being to keep on only those men whom it was desired should be especially retained.

II.—DOMINION NAVIES.

Australia.

After years of cutting down owing to the financial condition of the country, Australia in 1933 began to take steps to restore her Defence Forces to something like their former state. Sir George Pearce, Minister for Defence, said in June, 1933 : "Australia's defence system has been starved for three years, and it has become necessary to build it up from bed-rock. To do this we shall not only have to spend money, but we are also consulting the British Admiralty, War Office, and Air Ministry as to our programme for 1933–34."

Inquiries were made regarding the construction in Britain or Australia of a 7,000-ton 6-in. gun cruiser of the " Leander " class to replace the Brisbane, completed in 1916. On October 17, the flotilla leader Stuart, and the destroyers Vampire, Vendetta, Voyager and Waterhen left England under the command of Captain A. G. Lilley, R.N., for Australia to replace the destroyers loaned to the Commonwealth Government in 1919.

The seaplane-carrier Albatross was paid off into reserve on April 26, 1933, and the surveying ship Moresby, which had been out of service for three years, was recommissioned on April 27, 1933.

Canada.

Commander P. W. Nelles, R.C.N., was promoted to Captain, R.C.N., on January 1, 1933—the first officer to obtain this rank after serving up through the lower grades of the service. On January 17, he joined the Imperial Defence College for the 1933 course. Commander E. G. G. Hastings, O.B.E., lent from the Royal Navy, became Director of Naval Intelligence, Ottawa, on August 10, 1933, succeeding Commander W. B. Hynes, D.S.O., Commander C. T. Beard, R.C.N., after being lent to the Royal Navy to command the destroyer Windsor, became Director of Naval Reserves, R.C.N., on July 4, 1933.

Extended cruises were made during the year by all four destroyers of the Canadian Navy—the Eastern Division (Saguenay and Champlain) under Commander L. W. Murray, and the Western Division (Skeena and Vancouver), under Commander G. C. Jones. The former visited Bermuda and several West Indian islands. The latter cruised off the coasts of British Columbia and California.

NEW ZEALAND.

The New Zealand Division again consisted, during 1933, of the cruisers Dunedin (flagship) and Diomede; the Philomel (depot ship and training establishment at Devonport, Auckland); the Wakakura (minesweeping trawler); and the R.F.A. Nucula (squadron oiler). The sloops Laburnum and Veronica, maintained at the expense of the Imperial Government, were again attached to the Division.

The Diomede was paid off at Devonport, N.Z., early in May, and underwent a refit, the broad pendant of Commodore F. Burges Watson being transferred from her to the Dunedin. On August 3, 1933, the Diomede was completed to full crew at Auckland under the command of Captain C. M. Graham, R.N.

INDIA.

The Admiralty announced on August 16, 1933, that Messrs. Hawthorn, Leslie & Co., Ltd., of Hebburn-on-Tyne, had received an order for a first-class sloop for the Government of India. A similar vessel, the Hindustan, was completed in October, 1930, by Messrs. Swan, Hunter and Wigham Richardson, Ltd., at Wallsend-on-Tyne.

Sub-Lieutenant Hajee Mohammed Siddiq, the first Indian to receive a commission in the executive branch of the Royal Indian Marine, returned to India in September, 1933, after two years' training in England. He joined the Erebus in September, 1931, and a year later was appointed as midshipman to destroyers for four months, afterwards taking courses in gunnery, torpedo, navigation, signals and minesweeping. In the autumn of 1933 there were ten Indian cadets under training in England, three executive and seven engineering.

The first Indian to obtain a commission in the engineering branch was Dijendra Nath Mukerji, a Bengali young man. Educated at Patna, he was trained in mechanical engineering at Calcutta, and specialised in marine engineering at Glasgow. He worked in the yards of Messrs. Simons, the dredger builders. He was appointed an engineer sub-lieutenant on probation on January 6, 1928, was subsequently confirmed from the same date, and promoted to engineer lieutenant on January 6, 1931. In October, 1932, he was appointed engineer officer of the surveying ship Investigator.

III.—THE YEAR'S EVENTS.

There were no Royal visits to the Fleet during 1933 as in the previous year, but on July 25 the King and Queen proceeded to Cowes in the Royal yacht Victoria and Albert. Their Majesties were saluted by H.M.S. Rodney, which acted as guardship during Cowes Week. On July 26 the King and Queen visited Southampton in the yacht and opened the new graving dock, the largest of its kind in the world.

The Home Fleet spring cruise lasted from January 9 to March 29, and was to Gibraltar and the coast of Spain as in previous years. No detachment was sent to the West Indies as in 1932 and 1931. No combined exercises between the Home and Mediterranean Fleets were held, but the destroyer flotillas of the fleets exercised together off Palma, Majorca.

The summer cruise of the Home Fleet was remarkable for the large number of coast towns and holiday resorts visited by the ships (over thirty by the larger vessels and over twenty more by destroyers). The Nelson and Warspite made a cruise to Norway and Denmark. The customary visits to Baltic ports were carried out by a detachment under Rear-Admiral P. L. H. Noble, consisting of the York, Cairo, 6th Destroyer Flotilla, and 2nd Submarine Flotilla.

In the autumn the Home Fleet proceeded as usual to the east coast of Scotland for exercises which are referred to elsewhere. This was the first cruise under the command of Admiral Sir William Boyle, who succeeded Admiral Sir John Kelly as Commander-in-Chief on September 14. Further visits were carried out during the autumn cruise, and from September 4 to 10 the York visited Helsinki in connection with the British Week in Finland.

Normal cruising programmes were carried out by the squadrons oversea. In September, the second summer cruise of the First Destroyer Flotilla, Mediterranean Fleet, was extended from Alexandria to the Persian Gulf, where the vessels ("Duncan" and "Defender" class) visited friendly Sheiks. Several units of the China Fleet visited Japanese waters in October.

Tributes to the work of the Mediterranean Fleet following the earthquakes at Chalcidice in the autumn of 1932 were paid in the Greek Senate on September 22, 1933, when a Bill was introduced for the resettlement of the victims of the disaster. In the same month, approval was given by King George to a number of British naval officers to wear decorations conferred upon them by the President of the Hellenic Republic in recognition of their services.

The British cruiser Despatch (Captain the Hon. E. R. Drummond, M.V.O.) in September 1933, conveyed the body of King Feisal of Iraq from Brindisi to Haifa. The king died suddenly at Berne, and his body was taken on board the Despatch on September 11. The vessel arrived at Haifa on the 14th, being met by the Queen Elizabeth, flying the flag of Admiral Sir William Fisher, and the sloop Bryony.

Trade Protection Exercise.

On their way out to Gibraltar, ships of the Home Fleet carried out a trade protection exercise in the Bay of Biscay from 4 a.m. on January 10 to 5 p.m. on January 12, in order to demonstrate the capacity of modern cruisers to carry out raids on merchantmen, and to test the degree of immunity of the latter when proceeding by "evasive routes." The Red Fleet consisted of the Warspite, Malaya, Adventure, Cairo and York (the Adventure and Cairo representing "York" class cruisers), under the command of Rear-Admiral R. M.

Colvin. The Blue Fleet consisted of the Dorsetshire and Exeter, under the command of Rear-Admiral P. L. H. Noble. The nineteen other vessels taking part represented unarmed merchant ships under Red Fleet protection. Among them was the Fleet flagship Nelson, on board of which Admiral Sir John Kelly, Commander-in-Chief, acted as Chief Umpire.

Press correspondents were permitted on board certain ships and according to their reports seven Red merchant ships were captured and one Red cruiser sunk. Including vessels brought back into the exercise after being captured, a total of twenty Red merchant ships entered the exercise area, of which seven, or 35 per cent., were captured during the three days' operations. Blue, on the other hand, lost two out of three raiding cruisers, as the Exeter was sunk but brought back for exercise purposes and sunk again. The Dorsetshire, flagship of Rear-Admiral Noble, took all the seven prizes and although pursued got away without being brought to action.

Coast Defence Exercise.

A coast defence exercise in which the Navy and R.A.F. co-operated—the first of its kind ever held in this country—took place on September 22 and 23, 1933, off the Firth of Forth. A Red Fleet, under the command of Rear-Admiral W. M. James, C.B., composed of three capital ships, two aircraft carriers, with their complement of aircraft, three cruisers and twenty-one destroyers, constituted the attacking force, which endeavoured to bombard and bomb a naval base situated at Elie, Fife, on the northern shore of the Firth of Forth. The defence was entrusted to a Blue Air Force, under the command of Air Marshal R. H. Clark-Hall, C.M.G., D.S.O., who had nine squadrons of bombers and torpedo bombers.

This exercise was designed primarily for training purposes, and was of an elementary nature intended to exercise shore-based aircraft in work over the sea in contact with naval forces, and also the anti-aircraft defence of the ships. The movements and dispositions of the naval forces were arranged solely with this object. No "casualties" were imposed nor any attempt made to keep "scores." All this was explained in detail carefully beforehand to members of the Press, but in their eagerness for thrills several correspondents, or the sub-editors who handled their reports, contrived to convey misleading impressions from which certain erroneous tactical conclusions were drawn. "Three Battleships 'Wiped Out' by the the R.A.F." ran the streamer heading across the page of one evening paper, supported by the sub-heading, "Eight Bombs Hit Decks." The result of the operations clearly demonstrated the need for more searching and thorough investigation of some of the problems raised. This first conjoint exercise, though it served a useful purpose in bringing the staffs of the two Services together and providing experience for the personnel, afforded no reliable hints in policy, and in one sense may be said to have had an unfortunate influence in lending apparent support to the extreme school which

advocates the rapid development of aircraft at the expense of the older and well-tried means of defence.

Navy Week.

Navy Week was held in 1933 from Saturday, August 5, to Saturday, August 12, inclusive, omitting Sunday, the 6th. The Week was officially opened at Portsmouth by Lord Jellicoe, in a speech from the starboard cathead of H.M.S. Victory. On August 6, divine service on board the Victory was broadcast by the B.B.C. At each port, old and new exhibitions and attractions were presented, but in spite of the generally fine weather the attendances were below those of 1932, as follows :—

	1933.	1932.
Portsmouth	127,083	128,497
Plymouth	60,045	70,160
Chatham	64,924	83,142

The boys of the Royal Hospital School, Greenwich, went on leave from the old establishment for the last time on March 22, 1933, and on April 27, 1933, reassembled in the new buildings of the School at Holbrook, Suffolk. The main body of the boys were conveyed from Greenwich to Ipswich by special train. Captain Evan Bruce-Gardyne, D.S.O., became Superintendent of the School on March 31, 1933, in succession to Rear-Admiral L. R. Oliphant.

On July 26, the Prince of Wales visited the new School and formally inaugurated the buildings. H.R.H. arrived by air, and spent about two hours at the School. In the forenoon of the same day, the first prize distribution was carried out by Sir Bolton Eyres Monsell, First Lord of the Admiralty.

Charles N. Robinson,
Commander, R.N.

CHAPTER II.

Foreign Navies.

It is now strikingly evident that the sole results of the Washington and London Treaties, and the prolonged Disarmament Conference, have been to cripple the British Navy and to impel every other Power with any pretensions to a fleet, except Germany, to build as they have never built before. Even Germany is straining at her bonds, and threatening to increase her Navy beyond the restrictions of the Peace Treaty. The years of deliberation at Geneva on disarmament have produced no agreement which would tend to check the growing threat to our sea security, nor does the impoverished state of their national finances prevent foreign nations from continuing to increase their fleets. Indeed, the United States, in the throes of a financial cataclysm, actually adopted a huge naval construction programme as one of their measures for promoting national recovery.

There is every indication that, on the expiration of the London Treaty in 1936, Japan will claim " parity in principle " in regard to naval strength as compared to the British Empire and the United States. It has been stated categorically that she will do so by a "spokesman" for her Foreign Office, while M. Naotake Sato, her delegate to the Disarmament Conference, opposed the inclusion in the proposed draft armament treaty of any extension of the Washington and London agreements, in order that their provisions should not be carried on after the expiration of the latter. A claim by Japan for naval parity will certainly meet with very strong opposition in America, while it is not likely to be viewed favourably by Britain. This is not the least of the many thorny questions which will arise at the international naval conference due to be held in 1935, unless by then the Disarmament Conference has arrived at any agreement which would make a naval meeting unnecessary—a highly unlikely contingency in view of the situation at the close of 1933. The United States show no signs of agreeing to reduce battleship tonnage from the 35,000 of the Washington Agreement to the 22,000 proposed by Britain; nor do they seem disposed to reduce the individual tonnage of their cruisers. Japan desires the abolition of aircraft carriers; but, again, the United States disagrees. Britain, the United States, and Italy support the total abolition of submarines; Japan, France, and a host of smaller naval Powers regard them as indispensable.

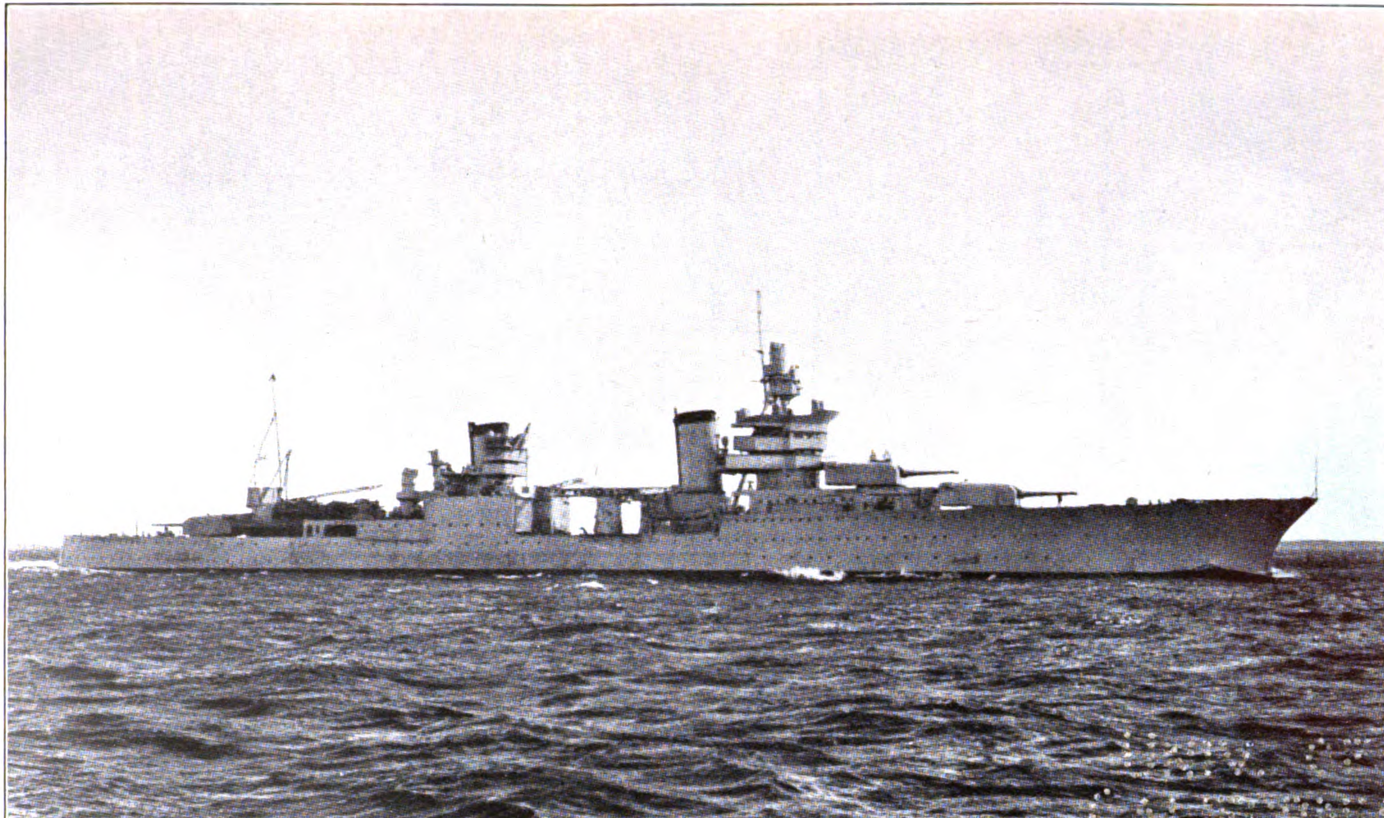
Should the termination of the London Treaty find such a diversity of views and claims as to make any further agreement between the Powers regarding limitation of various classes of men-of-war impossible—a condition of affairs which may well arise—it may be that

Britain will be the ultimate gainer thereby. A revival of our shipbuilding industries will go far to solve unemployment. Once free to build the ships—especially cruisers—we sorely need, and to re-establish our naval prestige, *vis-à-vis* any and every foreign Power,

TABLE "A."—WARSHIPS COMPLETED, BUILDING, AND APPROPRIATED FOR DURING 1933.

NAVY.	Capital or Coast-Defence Ships.	Cruisers (Category A).	Cruisers (Category B).	Minelayers.	Aircraft carriers.	Flotilla leaders.	Destroyers.	Escorteurs.	Submarines.	Sloops.	Coastal motor-boats, torpedo-boats, etc.	Gunboats.	Minesweepers and Netlayers.
British Empire .	..	..	14	..	..	4	24	..	13	15	..	2	..
United States . .	..	8 [1]	4	..	3	8	24	..	6	2	..	..	..
Japan [2]	..	..	4	1	1	..	13	..	9	..	4 [5]	..	9 [3]
France	1	1	7	..	..	12	1	4	25	4	12 [4]	3	..
Italy	..	2	8	..	..	..	8	..	25	..	..	..	..
Germany . . .	3	..	..	..	..	..	..	..	..	..	..	..	..
Spain	..	2	..	..	..	3	..	..	..	..	..	..	..
Denmark . . .	..	..	..	..	..	..	..	..	..	..	3 [5]	..	..
Finland . . .	1 [6]	..	..		..	..	..	..	..	..	..	..	..
Netherlands . .	..	..	1	..	..	..	..	..	7	..	..	1	1
Norway . . .	..	..	..	..	..	..	..	..	..	1 [7]	..	..	..
Portugal . . .	..	..	..	..	..	..	5	..	3	5	..	..	..
Rumania . . .	..	..	..	..	..	..	..	..	1	..	..	..	..
Sweden . . .	..	..	..	..	1	..	..	..	2	..	4 [8]	..	..
Argentine . . .	..	..	..	..	..	..	..	..	3	..	..	..	..
Brazil	..	..	..	..	..	..	..	..	..	1 [9]	..	2	..
China	..	..	1	..	..	..	..	..	..	..	..	8	..
Manchukuo . .	..	..	..	..	..	..	..	..	..	..	5 [10]	..	..
Total, exclusive of British Empire	5	13	25	1	5	23	51	4	81	13	28	14	10

[1] One cannot be laid down before January 1, 1934.
[2] The Japanese figures include ships "projected" as they cannot be distinguished from those "appropriated for."
[3] Includes three small minelayers.
[4] Despatch vessels.
[5] Torpedo boats.
[6] Coast defence ships.
[7] Minelayer and training ship.
[8] Vedette boats.
[9] Training ship.
[10] Naval police boats.



THE U.S. CRUISER PORTLAND, 10.000 TONS.

Completed, February, 1933.

the lessons of history all go to show that there will be an automatic increase in our Mercantile Marine, with all the prosperity that this would bring in its train.

As regards warship building for foreign navies, the popularity of Italian construction seems to have spent itself, while Portugal, in rebuilding her Navy, has gone in whole-heartedly for British designs.

TABLE "B."—FOREIGN SHIPS BUILDING, ORDERED, OR COMPLETED DURING 1933 IN:—

Ordered by	Great Britain.		Italy.	France.	Japan.
	Sloops.	Flotilla leaders or destroyers.	Sub-marines.	Mine-layers.	Naval Police Boats.
Argentine	..	..	3	..	..
Manchukuo	..	..	..	..	5
Poland	..	..	..	1	..
Portugal	4	2	..	..	..
Rumania	..	..	1	..	..

UNITED STATES.

A comprehensive statement on naval policy was issued by the Secretary of the Navy in the summer of 1933. The following are the principal points of interest:—

General Naval Policy.—To create, maintain, and operate a navy second to none and in conformity with treaty provisions. To develop the navy to a maximum in battle strength and ability to control the sea in defence of the nation and its interests. To organise the Navy for operations in either or both Oceans so that expansion will only be necessary in the event of war. To support American interests, especially the development of American foreign commerce and the merchant marine. To encourage civil industries and activities useful in war.

Fleet Building and Maintenance.—To build and maintain a fleet of all classes of fighting ships of the maximum war efficiency as permitted by treaty provisions; to replace over-age ships under continuing programmes. To prepare and maintain designs for new ship construction of all types; and to make superiority in their class the end in view in the design of all fighting ships. To provide great radius of action in all classes of fighting ship.

Capital Ships.—To replace existing capital ships when treaty provisions permit.

Naval Air Service.—To develop naval aviation primarily for operations with the fleet.

Heavier-than-air Craft.—To build and maintain aeroplanes to the full complements authorised for aircraft carriers and tenders, battleships, cruisers, and marine expeditionary forces.

Lighter-than-air Craft.—To maintain as necessary the rigid airships now built and building, to determine their usefulness for naval and other Government purposes, and their commercial value. To build non-rigid airships only for training purposes.

Conversion.—To maintain detailed plans for rapid acquisition and conversion of merchant vessels to naval use in time of emergency.

Fleet Operating.—To organise forces afloat so as to obtain maximum administrative efficiency, tactical and strategical flexibility and mobility, decentralisation and unity of command. To assemble the United States fleet for a period of not less than two months at least once a year. To keep in commission, fully manned and in active training, a maximum number of fighting ships. To exercise economy in expenditure compatible with efficiency.

Shore Establishments.—A system of outlying naval and commercial bases suitably distributed, developed, and defended is one of the most important elements of the

national strength. To retain only those shore stations that would be of use in war. To further the development of outlying bases in the Hawaiian Islands and the Canal Zone. To further the development of two main home bases on each coast.

Personnel.—To maintain the personnel at the highest standard and in sufficient numbers to meet the requirements of naval policies. To assign officers to duty in foreign countries to broaden and perfect their professional education. To retain a reasonable excess of petty officers over those required for peace-time operation of the Navy. To avoid frequent shifting of personnel.

Information.—To acquire through naval and other agencies accurate information concerning the political, military, naval, economic, and industrial policies and activities of all countries. To provide protection against espionage. To keep the public informed of the activities of the Navy compatible with military secrecy.

As a statement of standards and ideals for which it is intended to work, the above cannot but command admiration, and such a robust exposition of policy may well merit imitation by our own authorities.

Naval Estimates.

In March, 1933, the Navy Appropriation Bill for 1933–34, with a total estimated expenditure of $308,669,562, was approved by the President. But in May it was announced that this was to be reduced by $53,000,000. This economy was to be effected mainly by a reduction in enlisted personnel and a 15 per cent. cut in the pay of officers and men, compulsory retirements, and lower pensions; also by the suspension of certain shore establishments and restrictions to allowances of fuel and practice ammunition.

On the other hand, the introduction of the Industrial Recovery Act has afforded a great opportunity to the Navy Department to accelerate their construction and modernisation programmes on the plea that about 85 per cent. of the cost of shipbuilding is spent in wages. In addition to the $238,000,000 originally allocated to construction, the Secretary of the Navy has asked for sums of $77,000,000 and $37,000,000 for further modernisation and improvements of battleships and cruisers, and for the development of bases. The outcome of this policy of a reduction in the numbers of personnel with an increase in the number of ships would seem likely to be that the problem of efficient manning will become acute in future years.

Material Matters.

As regards modernising, the five battleships California, Tennessee, West Virginia, Colorado, and Maryland have still to be completed. In addition, the New York and Texas, which have been modernised in other respects, are to have the elevation of their turret guns increased.

The new building programme to be undertaken under the National Industrial Recovery Act provides for thirty-two ships to be completed within three years and includes :—

2 Aircraft carriers of 20,000 tons: Yorktown and Enterprise.
4 Cruisers of 10,000 tons, each to be armed with fifteen 6·1-in. guns: Savannah, Nashville, Brooklyn, and Philadelphia.
4 Destroyers of 1,850 tons.
16 Destroyers of 1,500 tons, probably armed with 5-in. guns.
4 Submarines of medium size.
2 Gunboats of 1,500 to 2,000 tons.

One of the cruisers will have a landing-on deck. Contracts for two of the above cruisers have been placed in private shipyards, and two have been allotted to Navy yards. This programme is in addition to the seventeen ships already under construction and appropriated for up to the end of 1934. The latter included :—6 cruisers of the 10,000-ton 8-in. gun class ; 1 aircraft carrier of 13,800 tons ; 8 destroyers ; 2 submarines. Of the above six cruisers, five are due for completion during 1934, the sixth—which will be the sixteenth vessel of the class—cannot, under the London Treaty, be completed before 1936. It is reported that the remaining two 8-in. cruisers which were optional under the Treaty will be proceeded with. They are due to be laid down in 1934 and 1935 respectively. The small aircraft carrier Ranger was launched at Newport News in February, 1933, and is due for completion early in 1934. Of the destroyers, five are due for completion in 1934 ; the remaining three, which were authorised as long ago as 1916, but not provided for until 1933, are due to complete in 1935. The whole of the United States' naval construction is in accordance with the provisions of the London Treaty.

Personnel.

Admiral W. V. Pratt relinquished the post of Chief of Naval Operations on June 30, 1933, and was placed on the retired list the following day. He reached the age limit of sixty-four on February 28, 1933, but, at the request of President Roosevelt, he remained in office. His successor is Admiral W. H. Standley.

As one of the economy measures, the enlisted personnel of the Navy, which previously stood at 79,700, is being reduced by curtailing recruiting for a year. The effect will be to lower the average enlisted personnel for all vessels from 82·5 per cent. to approximately 75 per cent. of the full complement.

Naval Air Service.

Estimates for the fiscal year ending June, 1934, provide $22,000,000 for the Naval Air Service. The sum allocated for new aircraft shows an increase of $3,000,000. All battleships have been provided with three aeroplanes ; the 8-inch cruisers have four each ; 6-inch cruisers two ; the Lexington and Saratoga seventy-two each ; and the Langley twenty-nine.

The United States Navy sustained a severe loss when the large new rigid airship Akron fell into the sea off the New Jersey coast during a heavy storm on the night of April 3/4, 1933. Of the seventy-seven officers and men on board, only one officer and two men survived. Amongst those who lost their lives was Rear-Admiral W. A. Moffett, Chief of the Bureau of Aeronautics, who had practically created the United States Naval Air Service in its modern form. Undeterred by this disaster, the authorities have proceeded with the trials of the still newer Macon, which are reported to have been

satisfactory. Tbe Macon will operate from the new Naval Air Base at Sunnyside, California.

It is possible that the Los Angeles will be reconditioned to replace the Akron.

JAPAN.

In spite of arguments and appeals by the League of Nations, Japan is pursuing a virile and independent course, and establishing herself as the predominant Asiatic Power. Bent on making her expanding interests no less secure on the sea than on the mainland of the continent, she is jealously watching the growth of a great fleet on the opposite side of the Pacific, and straining her resources to match it within the limitations at present imposed on her. Under revised regulations for the General Staff of the Navy, issued in September, 1933, the Minister of Marine remains responsible for administration, but the staff is given increased power in regard to policy and can convey the Imperial instructions to the commanders without requiring the sanction of the Minister.

The position as regards the original 1931–36 building programme towards the close of 1933 was :—

Building.—2 8,500-ton cruisers : the Mogami and Mikuma ; 6 first-class 1,400-ton destroyers : the Hatsuharu, Nenoi, Wakaba, Hatsushimo, Ariuke, and Yugure ; 3 590-ton torpedo boats : the Manazuru, Chidori, and Tomazuru ; 5 submarines ; 3 minelayers ; 2 mine-sweepers.

Projected.—2 8,500-ton cruisers ; 1 minelayer ; 6 first-class destroyers ; 1 torpedo boat ; 4 submarines ; 4 minesweepers.

The small aircraft carrier Ryujo was commissioned at Yokosuka on May 9th, 1933.

Originally it was intended that a second naval programme should be initiated in 1934–35 ; but the Naval General Staff is urging that this should be started at an earlier date. It is represented that Japan's commitments in Manchukuo and the gravity of her international relations make it necessary to accelerate ship construction. According to a Press report from Tokio, the new programme would make provision for thirty-three vessels to be completed in three years at a cost of £31,000,000.

It includes : 2 8,500-ton cruisers ; 2 10,000-ton aircraft carriers ; 1 5,000-ton minelayer ; 6 submarines ; 14 1,400-ton destroyers ; 4 torpedo boats ; 4 submarine chasers.

This programme would be entirely in accord with the London Treaty, and it has been officially stated that no plans have yet been made for construction after the expiration of the Treaty. Officers and men contributed to a collection made on Navy Day—the twenty-eighth anniversary of the battle of the Japan Sea—the proceeds of which will be devoted to national defence.

NAVAL BASES.

As part of her general naval policy, Japan is desirous of consolidating and developing her strategical position in the Far East.

Port Arthur, which guards the Gulf of Chihli and communications with North China, has been formally constituted a minor Naval Station. Rear-Admiral Tsuda, who previously commanded the Second Foreign Service Squadron, was appointed to that base during the summer of 1933. The ships of his squadron are now included in the Port Arthur Command. One of the principal objects of the base is to afford repair facilities for vessels in Manchurian waters.

Japan having given notice to withdraw from the League of Nations, the question has arisen as to her position in the various Pacific islands mandated to her after the War. She maintains that her right to these islands, which were originally German property, is derived from secret agreements made during the War, effect to which was given in Art. XXII of the Versailles Treaty. This vested the mandate in the Emperor, and therefore she is not prepared to surrender any part of these territories to any other Power. In spite of the fact that both the League Covenant and the Washington Naval Treaty prohibit the fortification of the islands, or the establishment of naval or military bases there, and that it has been authoritatively announced that there is no intention of departing from these conditions, the Navy Department has made it known that they regard the islands as being of great value to Japanese naval strategy. Commercial bases, which are necessarily potential naval bases, are being developed in selected positions. The Vice-Minister of the Overseas Affairs Department has stated that, although the South Sea Islands are held "nominally" under League mandate, they have but "little connection with the Geneva organisation."

Japan welcomes the independence of the Philippines as a manifestation of American policy "to leave the peace of the Orient to orientals; a trust in which she regards herself as the leader."

At the beginning of 1933 Admiral Mineo Osumi succeeded Admiral Keisuke Okada as Minister of the Navy, the latter having resigned on account of ill health.

Naval Air Service.

The Minister of Marine has stated that Japan is now building aircraft equal in every respect, if not superior, to those constructed by foreign Powers, and that the Navy was doing its utmost to develop its air arm. He was strongly opposed to a separate Air Ministry, which, in his opinion, would "be more of an encumbrance than an advantage."

The proposed new naval programme includes an addition to the Naval Air Service of five flying-boat squadrons, at a cost of £9,000,000. Some three years ago Japan purchased the licence to build large Short K.F.1. flying boats. The last remaining airship in commission has been withdrawn from service, and it has been decided to abandon lighter-than-air craft for naval work.

Naval Review.

On August 25, the Emperor reviewed in Tokio Bay the strongest fleet which has ever saluted a Japanese ruler. The 161 men of war present aggregated 847,766 tons, as compared with 703,295 tons at the 1930 review. In addition 180, as compared with 72, aircraft were included in this great parade.

FRANCE.

The death of M. Georges Leygues, the veteran Minister of Marine, on September 2, 1933, was a great loss to the French Navy, which he had served loyally and zealously through many years of office. Speaking to the officers and men of the battleship Lorraine at the beginning of the year he said that the construction of the German battleship Deutschland and her two sister ships constituted a menace to the French lines of communication. A "rapid decision" was necessary to guard against the danger, hence they had given orders to begin work on the Dunkerque. He added that naval activity has been greatly intensified, as shown by the execution of naval programmes, the reorganisation of the forces, intensified training of divisions, and the resumption of training cruises.

M. Leygues was succeeded by M. Albert Sarraut, a former Minister of Marine. A rare tribute to the memory of the former was the decision to rename the new 7,600-ton cruiser Chateaurenault the Georges Leygues.

The Naval Estimates for 1933 provided for a total expenditure of 2,839,838,570 fr., which was 375,244,789 fr. less than the previous year. 332,000,000 fr. of this reduction represent economy in new construction. An official report which accompanied the estimates devoted much space to a comparison of French and Italian sea power. Anxiety was also expressed at recent reduction in and slowing down of new construction; special mention was made of the fact that progress on the Dunkerque was not as rapid as could be wished.

New Construction.

The battleship Dunkerque was formally laid down at Brest on December 28, 1932, and it was hoped then that she would be ready to be launched in the spring of 1934. It has been officially announced that her armament will be eight 13-inch guns in two quadruple turrets, and sixteen 6·2-inch. The general appearance of the ship will be not unlike a miniature Nelson, with the main armament mounted in superimposed turrets on a long forecastle. The secondary armament will be so arranged that fire from three quadruple turrets can bear dead astern and that of two pair of turrets dead ahead. All turrets will have wide arcs of training. The ship will displace about 26,500 tons, and is expected to have a maximum speed of over 30 knots. She will, therefore, be both faster than any battleship afloat and more powerfully armed than the Deutschland.

The following is the position of the ships provided for by the post-War Navy Bill of 1922 :—

Commissioned.	*Building.*
6 10,000-ton cruisers.	1 10,000-ton cruiser.
3 7,249-ton cruisers.	6 7,600-ton cruisers.
1 9,743-ton training cruiser.	1 5,886-ton cruiser minelayer.
1 4,773-ton cruiser minelayer.	12 2,560-ton flotilla leaders.
1 22,146-ton aircraft carrier.	1 1,378-ton destroyer.
1 10,000-ton aircraft transport.	13 first-class submarines.
19 Flotilla leaders of over 2,000 tons.	10 second-class submarines.
28 Destroyers of over 1,300 tons.	2 minelaying submarines.
1 Cruiser submarine—2,880 tons.	4 sloops.
26 first-class submarines.	12 despatch vessels.
21 second-class submarines.	3 river gunboats.
5 minelaying submarines.	4 escorteurs.
1 submarine depot ship.	
3 1,969-ton sloops.	

8 more escorteurs are also projected.

As from the early part of 1933, the first line home forces, except the battleships, have consisted entirely of vessels of the post-War naval programme. Regional and overseas forces still include a few old surface vessels, but the submarines are of post-War construction, and replacement of the old ships is proceeding.

Personnel.

The total number of officers authorised by the *Loi des Cadres* of 1929 is still short to the extent of two Vice-Admirals, one Captain, seven Commanders, six Lieutenant-Commanders, and two Lieutenants. The only increase in executive officers has been in the number of Sub-Lieutenants.

The effective personnel of men remains at 53,750. The provision of new entries to replace pupils at the naval schools has been held up for financial reasons. At present, ships regarded as being in full commission have a three-fifths complement, those in the reduced commission category have a two-fifths complement. If, however, these replacements are not forthcoming during the next budgetary year, every vessel taken into service will necessitate a serious reduction in the complement of some other ship.

On the completion of her first round-the-world cruise with 160 cadets and instructors, most favourable reports were received of the training cruiser Jeanne d'Arc. Special mention was made of her seaworthiness, of the efficient working of her mountings and equipment generally, and of the ship's suitability and smart appearance.

Naval Air Service.

In spite of the creation of a separate Air Force and Air Ministry, the French Naval Air Service remains essentially a part of the Navy and under the Ministry of Marine. In March, 1933, an Air Force Constitution Bill defined the relations and responsibilities of the two Ministries. The Naval Air Force, as it is styled, is divided into three branches : the Fleet Air Arm ; the Naval Co-operation units

afloat; and the Autonomous Naval Air Force. The first two branches are purely naval, and the Air Minister is responsible only for *ab initio* flying training, equipment, and the maintenance of shore bases; and even this duty is carried out by naval officers appointed to a special directorate at the Air Ministry. The Fleet Air Arm comprises all embarked aircraft and a few training aircraft maintained on shore. The Naval Co-operation units not afloat include all shore-based reconnaissance units and a proportion of the torpedo-bomber units. The Autonomous Naval Air Force is composed of all shore-based fighter units and the remainder of the torpedo-bomber units. This force comes directly under the Air Minister. At present the personnel is seconded from the Navy, but eventually it will be replaced by Air Force personnel.

The Chief of the Navy Staff and a member of the *Conseil Supérieure de la Marine* appointed by the Minister of Marine are two of the six members forming the *Conseil Supérieure de l'Air.*

ITALY.

The Naval Estimates for 1933–34, amounting to 1,397,222,277 lire, were approved without discussion. The Minister of Marine, in his explanatory speech, remarked that there was a reduction of about 180,000,000 lire (about £2,000,000 at par) on last year; of this 125,000,000 lire represented a saving on new construction and 55,000,000 on the economy on the vote for the services. The first reduction would not cause any variation in the normal course of shipbuilding. During the past ten years the Government thought it essential that the mobile naval forces should be reorganised. The question of naval bases was also a fundamental one, because, if well chosen and fitted out they tend to increase the efficiency and value of the fleet. They are also essential, he said, for anti-aircraft defence and supplies.

New Construction.

The naval construction programme for the financial year 1932–33 comprised about 29,000 tons. Of this two cruisers somewhat similar to the Eugenio di Savoia class and two 600-ton torpedo boats have been laid down.

Reviewing the progress of the Navy during the ten years of the Fascist regime, Admiral Sirianni, in the spring of 1933, said that seven 10,000-ton cruisers were practically ready for service. In commission or in course of construction were twelve cruisers of 5,000 to 7,000 tons, twelve flotilla leaders, twenty-five destroyers, fifty-four submarines, four experimental torpedo boats, one submarine destroyer, four mine-layers, one seaplane carrier, and two training ships. Alluding to the value of battleships, he remarked that "within the limits of the Washington tonnage it is possible nowadays to construct a ...... ship which not only has a good capacity of resistance against all foreseeable attacks, but the use of which assures a real and effective superiority over all other forces."

Personnel.

The standard of the personnel of the Italian Navy is reported to be very good, and there is no dearth of recruits. The experiment of retaining conscript ratings in the service for a more lengthy period has not, however, given satisfactory results.

Extensive naval exercises took place during July in the triangle Naples-Sicily-Sardinia, one of the objects being to test the defences of the Straits of Messina between Sicily and the mainland. Of the 130 vessels engaged, only one old destroyer broke down for a few hours ; otherwise there was no failure in the efficiency of the ships. The King of Italy expressed his gratification at the results.

GERMANY.

On October 14, 1933, Herr Hitler announced that Germany would take no further part in the Disarmament Conference and would withdraw from the League of Nations. The Chancellor said that the German people were " deeply humiliated by the deliberate refusal of a real moral and actual equality," and could not continue negotiations as a " second-class Power without rights." The principle that Germany should be granted equality in armaments had already been conceded and the draft of the British Convention—the latest of the innumerable disarmament plans—contained a clause which specifically alluded to her being " freed from the naval limitations imposed on her by the Treaty of Versailles " ; the same clause added, however, that she would " stabilise her naval position up to 1936 at what it is to-day." Up to the date of her breakaway, moreover, there appeared to be no definite intention on her part to exceed the naval programme of replacement to which she was entitled under the Versailles Treaty ; but with the re-awakening of a national spirit which is the key-note of the present regime, the German Government may feel called upon to emphasise their assertion of independence by setting out gradually to rebuild a navy at least comparable to those of continental neighbours. All the more is this likely to be the case if those neighbours continue in their refusal to take active steps to reduce their own armaments.

New Construction.

The programme of battleship construction is proceeding steadily. Four armoured ships of the Deutschland class are now complete, building, or projected. The Deutschland was commissioned by Captain von Fischel on April 1, 1933. On the same day the Admiral Scheer was launched at Wilhelmshaven by the daughter-in-law of the commander of the High Seas Fleet at Jutland. The Ersatz Braunschweig was laid down at Wilhelmshaven in October, 1932, and a fourth ship is projected to be begun in 1934. It is reported that the Ersatz Braunschweig will be slightly longer than the Deutschland, and that she will have engines of 54,000 instead of 50,000 H.P. Her armament will be the same.

It is not improbable that Germany will demand the right to build a 26,000-ton capital ship to balance the French Dunkerque. The development of this new type of powerful fast battleship—really a small battle cruiser—is likely to influence building programmes generally after 1936.

The first post-War cruiser, the Emden, has been placed in reserve for an extensive refit. It is probable that she will be rearmed so as to bring her into line with the later ships. Built in 1925, the Emden's armament consists of eight 6-inch 45-calibre guns, mounted singly with old-fashioned armoured shields. The latest ships of the Leipzig class, with only 400 tons more displacement, carry nine 6-inch 50-calibre guns mounted in three triple turrets, giving a far superior broadside fire.

A sailing training ship for the Navy has been built to replace the ill-fated Niobe, and has been given the name of Gorch Fock, after a German poet sailor who fell at the battle of Jutland. She is barque-rigged, displaces 1,500 tons, and has an overall length of 239 ft. 6 in. An auxiliary motor gives her a speed of about 8 knots. Her complement is 126.

Personnel.

Another sign of Germany's resumption of her position as a naval Power was the appointment of Naval Attachés to London, Paris, and Rome in April, 1933. Her first Naval Attaché in London since the War is Captain Erwin Wassner, who formerly commanded the new cruiser Karlsruhe.

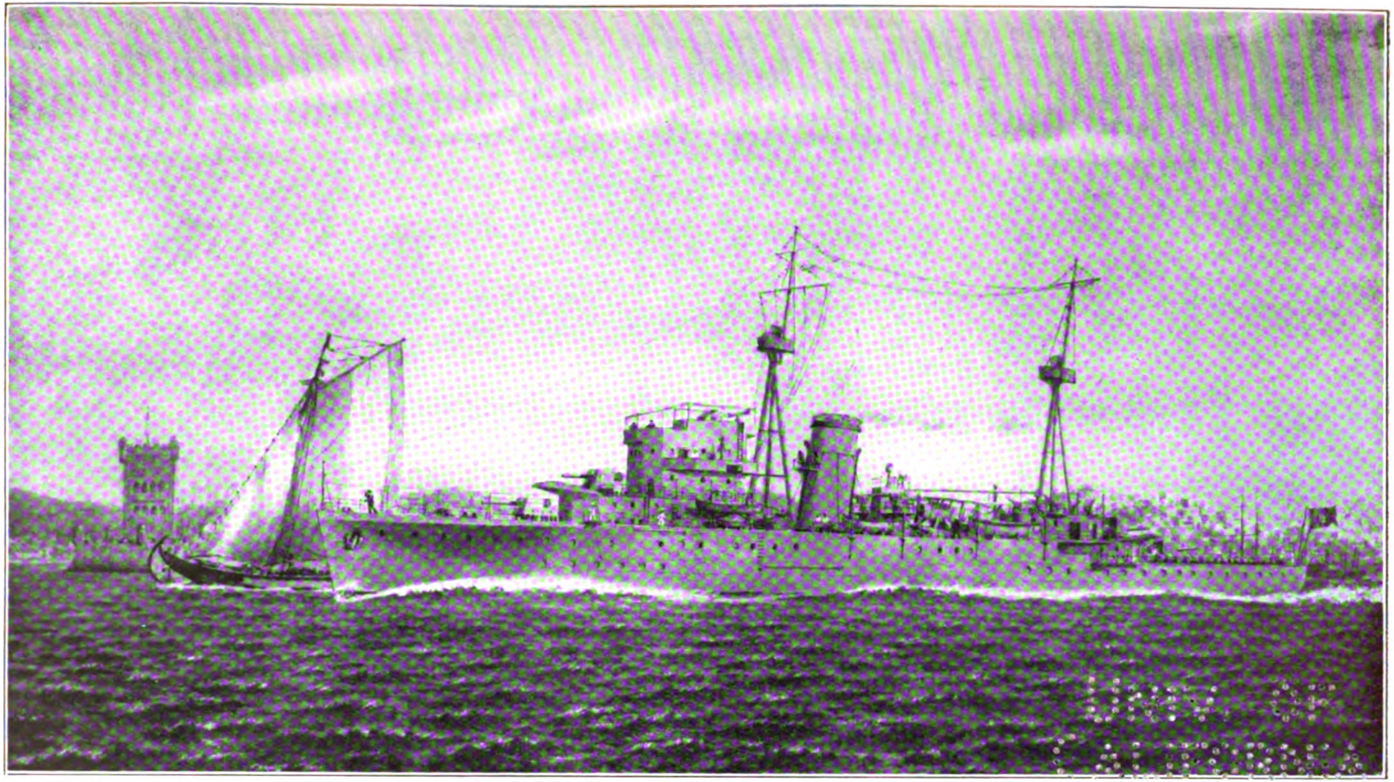
According to a recent report, the personnel of the German Navy includes 13,500 petty-officers and men, of whom 9,355 are Prussians and 2,575 from southern or inland states. Only 290 were originally seamen, the greater part of the remainder were technical workers and artisans.

A Submarine Defence School has been established at Kiel, and courses in the use of the hydrophone previously held at the Torpedo and Intelligence School at Flensburg have been transferred to the new school.

SPAIN.

Although it appears to take little or no part in the political tension and periodical upheavals, the Spanish Navy doubtless suffers from them, and new construction is delayed. Work on the Baleares and Canarias is proceeding slowly, but no date for their completion has yet been announced, although the latter ship was originally expected to be ready in the autumn of 1933.

On account of their strategical importance, increasing interest is being taken in the Balearic Islands, not only by Spain, to whom they belong, but also by France and Italy. Dredging operations on an extensive scale have been undertaken at Port Mahon in order to admit of the entry of large ships, and a year ago the Cortez approved of heavy expenditure to modernise the defences of that port. In asking for the necessary grant, the Minister of Public Works said



THE PORTUGUESE FIRST CLASS SLOOPS ALFONSO D'ALBUQUERQUE AND BARTOLOMEU-DIAZ, 2,000 TONS.

Painting showing their appearance when completed.

(By courtesy of the builders, Hawthorn, Leslie & Co., Ltd.)

that the islands must be made safe against " audacious and rapacious military action." Manœuvres held during the summer of 1933 represented a naval and aerial attack on Majorca. Admiral de Salas, Chief of the Naval Staff, and Señor Companys, the Minister for Marine, were both present.

France is reported to have been seeking a military understanding with Spain, and the importance of the Balearic Islands as a base for covering the passage of troops from Northern Africa is obvious.

According to a statement by the Minister of the Navy in the early part of 1933 the total personnel was 15,700.

OTHER CONTINENTAL NAVIES.

Denmark.

The fate of the Danish Navy is still undecided, and the annual political controversy continues. Those who would reduce it to a mere Coast Guard service argue that Denmark would never go to war by herself, and if she became embroiled in hostilities she could rely on allied assistance at sea. Attention is turning rather towards the danger of air attack, and the need for anti-aircraft defences is probably viewed in some quarters as being more pressing than the efficiency of the Navy. On the other hand, it is obvious to the military authorities that they cannot count on being able to move forces between the outlying islands and the mainland without the support and covering of naval units.

The new torpedo-boat Glenten was launched on January 5, 1933, at the Navy Yard, Copenhagen. She will carry an armament of six torpedo tubes and two 3-in. guns, and is due for completion in 1934. The new Royal Yacht Dannebrog was completed early in 1933. She is a vessel of 1,225 tons, with Diesel engines of 1,700 H.P. and a speed of 14 knots. The keel of an inspection ship to be called the Ingolf was laid down on February 1, 1933. A three-masted motor schooner the Nordstjernen has been taken over by the Navy for inspection duties in East Greenland waters.

Finland.

The Finnish Navy has been materially strengthened by the completion of the two 4,000-ton armoured ships Vainamoinen and Ilmarinen. These vessels have four Diesel engines of 1,000 H.P. and are credited with a speed of 16 knots, and, according to a report in the local Press, their four 10-inch guns are mounted in twin turrets and have a maximum elevation of 50°, giving an extreme range of 30,000 metres. The weight of the gun is 37 tons, and of the mounting 25·9 tons. The eight 4·7-inch guns are also mounted in twin turrets.

It is understood that further additions to the fleet are under consideration, and in May, 1933, a deputation representing the Navy League, headed by Admiral Schoultz, submitted a resolution to the

Minister of Defence urging the necessity for consecutive work on the planning and building of the Navy. The resolution particularly advocated a large number of small submarines ; the mere knowledge of their existence would, it was claimed, act as a deterrent to an invader.

Commander M. C. Despard, D.S.O., has continued in his appointment as Naval Adviser to the Finnish Government. A Naval Attaché has been substituted for the Military Attaché hitherto appointed to London.

Greece.

The destroyers Condouritis, Hydra, Spetsai, and Psara, built for the Grecian Navy at the Odera Works at Genoa, have been delivered.

Netherlands.

A great proportion of the naval effort of Holland centres in the Dutch East Indies, and, according to a report published in the middle of 1933, the Marine Department proposes to maintain the fleet in those waters at two cruisers, eight destroyers, and twelve submarines, with one cruiser, four destroyers, and six submarines in reserve. Of this force two cruisers, the Sumatra and Java, of 7,050 tons have been in the Indies for many years, together with six to eight destroyers and the twelve submarines K.2. to K.13. Submarines K.2., K.3., and K.4. are being replaced by K.14., K.15., and, when completed, K.16. The reserve submarines will be K.17. and K.18., instalments for which were voted on the 1930 budget, and K.19. and K.20. on the 1932 budget.

The reserve cruiser Celebes, of 5,250 tons, was due to be laid down before the end of 1933, but no provision has yet been made for the reserve destroyers.

On February 5, 1933, mutineers seized the old coast defence ship De Zeven Provincien in the harbour of Obeleh in Northern Sumatra while her captain and other officers were ashore. They arrested the nine officers on board and put to sea with the intention of making for Sourabaya, where there had already been trouble with the native ratings in consequence of a 17 per cent. cut in pay. Early on the morning of February 11 the ship was overtaken by a squadron of flying-boats. The mutineers were repeatedly summoned to surrender but refused to do so. Eventually a bomb was dropped and hit the ship, killing twenty-three and wounding twenty-five, amongst the casualties being most of the ringleaders. The rest surrendered at once. Admiral Osten subsequently informed the People's Council that the mutiny was planned by sections of both the European and native crew. It was made possible by the lack of special precautionary measures and by the absence on shore of the senior officers and the majority of petty officers.

The minelayer Krakatau, which suddenly capsized on October 11, 1932, has been raised and taken into Sourabaya.

Norway.

The only new construction in hand for the Norwegian Navy is a ship designed as a combined minelayer and training ship, and known as No. 119. She will displace about 1,600 tons and be armed with four 4·7-inch guns and four A.W. torpedo tubes in pairs. Her engines are Diesel-electric of 6,000 H.P., and her maximum designed speed is 20 knots. She is due for completion early in 1934, when she will relieve the old coast defence ship Tordenskjold for training duties. Public interest in naval matters is reported to be reviving, and it is hoped that it will encourage expansion in naval exercises and training, and an increase in the number of ships in commission.

Poland.

The estimates of 1933–34 amount to approximately £1,059,000, which represents a small increase on those of the previous year. The sum provided for new construction is nearly double that for 1932–33, but there is a very large saving on building, port installations, and repairs. The first stage of expansion of the Polish Navy was completed with the delivery of the destroyer Burga and submarine Zbik. An order has been placed in France for a 2,000-ton minelayer. This vessel will also be used as a training ship.

The personnel of the Polish Navy is now 335 officers, 1,588 permanent ratings, and 1,496 conscripts.

Portugal.

The first ship to be completed under the programme of reconstruction of the Portuguese Navy was the sloop Goncalo Velho, which was built by Messrs. Hawthorn Leslie at Hebburn-on-Tyne and which arrived at Lisbon on March 30, 1933. She is a vessel of 1,000 tons and carries an armament of three 4·7-inch and two 2-pdr. guns. Her speed is 16 knots. As a symbol of the re-birth of sea power, the ship's arrival was the occasion of much popular enthusiasm. As reported in last year's "Annual," another ship of this class is being completed by the same British firm, who are also building two 2,000-ton sloops for Portugal. The keels of these latter vessels, the Alfonso d'Albuquerque and Bartolomeu-Diaz, were laid at Hebburn-on-Tyne on May 25, 1933. They will be armed with four 4·7-inch and two 3-inch A.A. guns and four 2-pdr. pom-poms. They will also be equipped for minelaying and have accommodation for forty mines. The engines will consist of two sets of single reduction turbines with water-tube boilers, and the designed speed is 21 knots. A fifth sloop, the Pedro Nunes, of 1,000 tons displacement, is building at Lisbon.

The Vouga, the first of the two destroyers building by Messrs. Yarrow & Co. on the Clyde, was launched on January 25 and completed by July, 1933. She arrived at Lisbon on the 29th of that month and was greeted with much ceremony. The Portuguese

Government effected a saving of over £10,000 by making a cash settlement for this vessel. Three other destroyers are being built at Lisbon to Yarrow designs, and three submarines by Messrs. Vickers Armstrongs at their Barrow works. Special efforts are being made to train crews in readiness for commissioning the new ships as they are delivered.

Soviet Union.

It was reported in the Press last summer that the Soviet Government was negotiating with Italian shipbuilding firms for the construction of four cruisers and a large submarine. The cruisers, it is said, would be ships of about 7,000 tons with as powerful an armament as they can carry on the displacement. The submarine, which is intended for service in the Pacific, would be in the neighbourhood of 3,000 tons. It is proposed that payment for these ships should be extended over a period of six years.

In the early part of 1933 it was reported that the Council of the People's Commissars had approved increases of pay to all officers and men of the fighting services. The increases, which it is stated are to be permanent, vary from 40 to 100 per cent.

The submarine Rabotchi, which sank in the Gulf of Finland in 1931 after colliding with another submarine, has been salved, and it is reported that she is to be reconditioned.

Sweden.

The Naval Estimates for 1932–33 amounted to Kr. 39,104,450 (approximately £2,765,000 at par). This is nearly Kr. 5,500,000 less than the previous year. The proposed estimates for 1933–34 show a further drastic reduction affecting building and other services.

Progress on new construction, doubtless due to financial reasons, appears to be rather slow, but the four vedette-boats Jagarin, Kaparen, Vaktaren, and Snapphanen are completing. The first-named vessel was launched in December, 1932, and the second in May, 1933. It is unlikely that the original speed of 27 knots for which these craft were designed will be reached; it has already been reduced to 24 knots, and may be only 21 knots in later vessels. The following particulars supplement those given in last year's "Annual." The machinery consists of two Norman boilers and a de Laval turbine of 3,200 H.P.; the armament will be two 7·5-cm. and two 25 mm. A.A. guns. The hull is riveted, but trial is being made of welding certain parts.

It is reported that the armament of the hangar-cruiser Gotland has now been decided, and that it will consist of six 15 cm., four 75 mm. and six 40 mm. A.A. guns, and six 21-in. tubes. There will be accommodation for eight aeroplanes, and a catapult will be provided. The equipment will also include arrangements for mine-laying. The ship was launched on September 14, and is due for completion in 1934.

Turkey.

In company with other Powers in the Near East, Turkey is taking an increasing interest in naval aircraft, and the Government have ordered six Supermarine Southampton flying-boats from the Supermarine Aviation Works (Vickers), Ltd. This, the first order by that country for British aircraft, was given after keen competition with foreign firms.

Yugoslavia.

A new naval programme to cost about three million sterling was approved at the beginning of 1933. It will include two flotilla leaders, six destroyers, two submarines, and six coastal motor-boats. The programme has called forth some criticism in the Italian Press, and it has been asked somewhat pointedly, "Who is going to pay?" Meanwhile, it is clear that Yugoslavia is bent on building up her small but increasingly powerful navy.

SOUTH AMERICA.

Argentine.

The fleet has been reorganised, and is now divided up into a Battle Squadron, Special Service Squadron, Auxiliary Service ships, Inactive Ships, and the Naval Air Arm. The Battle Squadron consists of the two battleships Moreno and Rivadaria; the two new cruisers Almirante Brown and 25 de Mayo; nine destroyers, and four submarines. The Special Service Squadron comprises two gunboats and six minesweepers. The remainder of the surface fleet is made up of a training ship, guardships, despatch vessels, and other auxiliaries.

The Argentine Government has expressed readiness to scrap battleships, but while Chile was prepared to lay up her capital ships, Brazil, with her lack of modern cruisers and small craft, is not prepared to support the proposal.

Three submarines, the Santa Fe, Salta, and Santiago del Estero, built for the Argentine in Italy, were completed and made their passage out via Gibraltar and Cape Verdi in the spring of 1933.

Brazil.

The somewhat ambitious programme of new construction promulgated in 1932 and mentioned in last year's "Annual" is likely to prove slow in materialising. A beginning has been made, however, in the policy of modernising the Navy by an order placed with Messrs. J. I. Thornycroft & Co., Ltd., in the face of international competition, to reboiler the battleship Minas Geraes. The ship's new boilers will be the latest oil-burning water-tube type. In addition, a contract has been placed with Messrs. Vickers-Armstrongs for a new training ship to be called the Almirante Saldanha, and the vessel has been laid down at Barrow. She will carry nine guns of

unspecified calibre, three quick-firing and one A.A. gun, and one torpedo tube, and will cost £314,500.

A scheme has been approved for the earlier retirement of older officers and for the earlier promotion of younger officers.

A new naval dockyard is under construction on the island of Cobras, which will be capable of building ships up to 5,000 tons and with accommodation for three battleships, three cruisers, fifteen destroyers, fifteen submarines, and numerous other small craft. Naval Aviation bases are being created at Puerto Alegre in the State of Rio Grande do Sul and at Ladario in the State of Matto Grosso.

Chile.

The Chilean Navy is still suffering from political intrigues and the vacillating policies of a succession of opportunist ministers. The good work done by successive British Missions has been largely destroyed by inefficiency in administration since the revolution.

A general election was due to be held in the late autumn of 1933, to be followed by a new constitution. If this should lead to a stable Government and a return to a naval regime in which personal interests do not play the chief part, there is hope in the rising generation of naval officers, who have assimilated the right idea from the Missions.

ASIATIC COUNTRIES.

China.

On June 26, 1933, the three cruisers Hai-Chi, Hai-Shen, and Chao-Ho, which, until his downfall, formed part of a naval force maintained by Chang Hsueh Liang, mutinied and left Tsingtao for the southward. The Chinese Admiralty thereupon despatched a squadron, which included the new Japanese-built cruiser Ninghai, to Woosung to intercept the rebel ships; but the two squadrons carefully avoided contact, and on July 6 the Hai-Chi with her escorts entered the Canton delta unmolested. Five days later the Government squadron visited Hong Kong and anchored in British waters, but after a brief stay they returned to the Yangstze. Meanwhile the three mutineers proceeded up river to Whampoa. Negotiations for the disposal of the squadron are reported to have taken place between Chiang Kai-Shek and Chen Chi Tong, but the question of upkeep presented difficulties and the ships appear to have remained at the disposal of the Cantonese Government. Admiral Shen, the original commander of the naval forces at Tsingtao, resigned from that appointment, but continued in his office as Mayor of the port.

Manchukuo.

According to a Press report, the Manchukuo Government have placed orders in Japan for two 200-ton, four 45-ton, and three 10-ton naval police boats. These vessels are required to replace the force of gunboats and police craft which, under Marshal Chang, used

to suppress piracy and smuggling in Manchurian waters, but most of which fled at the time of the occupation of Mukden in September, 1931.

Persia.

The miniature Persian Navy, built and partly officered by Italy, which came into being in the autumn of 1932, signified its presence in a peculiarly unfortunate manner when, in July, the commander of one of the gunboats took it upon himself to haul down the Union Jack at Basidu in Kishm Island. The flag was flying on ground which has been in British occupation for a hundred years. A British man-of-war was sent to rehoist the flag and a naval guard was posted to prevent it being interfered with again. An official protest was made to the Persian Government, and the latter assured the British representative in Teheran that the action of the officers in question was quite unauthorised, and regrets were expressed for their behaviour.

In September, 1933, the First Flotilla of nine destroyers of the British Mediterranean Fleet paid visits to the friendly Sheikhs in the Southern Persian Gulf, and no doubt this display of force had a salutary effect in other directions.

E. Altham,
Captain, C.B., R.N.

CHAPTER III.

Comparative Naval Strength.

The outstanding features of a review of comparative naval strength in the closing months of 1933 are the large programmes of warship construction in the United States and Japan. On June 1, 1933, the United States had seventeen vessels of war under construction. On September 1, the total had risen to fifty-four, or more than threefold, chiefly as a result of the large amount of work sanctioned under the National Industrial Recovery Act. The force represented by this work is numerically stronger than the entire Home Fleet of the British Navy. The Japanese programme, which was not so far advanced, and may be modified before receiving final approval, included thirty-three new vessels, and even if a few cuts are made it must represent an appreciable addition to strength. In both countries, the programmes concern all four of the main classes of ship, apart from battleship—cruisers, aircraft carriers, destroyers and submarines. Among the European Powers, construction proceeded normally in accordance with programmes previously adopted.

Battleship Modernisation.

With the completion of the first post-War German battleship, the Deutschland, the beginning of the first French ship in this category, the Dunkerque, and the nearer approach of the expiry date of the London Treaty, increased attention is being given to relative strength in capital ships. Comparisons in this direction have now to take account of an additional factor. It is not enough to consider the displacement, gun-power, speed, or age of the ships; there is also the question of modernisation to be taken into account. Some degree of modernisation was inevitable when it became necessary to extend the life of ships well beyond the period for which they had been originally designed. But few, if any, of those who welcomed the "holiday" in battleship construction agreed to at Washington in 1922, and extended by the London Conference of 1930, could have foreseen the great expenditure which would be incurred in this direction.

During 1933, an expenditure of \$77,000,000 was allocated from the Public Works Fund in the United States to modernise their five latest battleships. Provision for the other ten ships was made some time ago, and all but one are back in service. The proposed expenditure on the two vessels of the Tennessee type (completed 1920–21) and the three of the West Virginia type (completed 1921–23) exceeds anything previously incurred. It will average over \$15,000,000 (or £3,000,000) per ship, more than the original first cost of the vessels. The reconstruction of the British battleship

Barham, which is due to be completed early in 1934, is estimated to cost £1,024,448, or about one-third of the sum estimated to be spent on each of the American vessels. As this expenditure must represent war effectiveness of some kind—whether in increased elevation and range of guns, better provision against under-water attack, additional deck protection against air bombs, new anti-aircraft batteries and fire-control systems, or new boilers and machinery improvements—it is reasonable to infer that the American battleships after reconstruction will have been given a marked degree of superiority over their contemporaries in the British Navy.

In announcing the modernisation programme for the five latest U.S. ships, Mr. Swanson, Secretary of the Navy, said on July 5, 1933: "When complete the United States Navy will be the equal, if not the best, of any in the world. We believe that it will be invulnerable. Our new or modernised battleships will be formidable. We are not building them for speed but to stand, deliver, and take it. They will be able to take and give a terrific pounding without being hurt." This confidence in the battleship is the more noteworthy coming from the Secretary of the Navy with the largest fleet air force, and which has conducted some exhaustive tests of the power of aircraft against capital ships.

Foreign Cruiser Activity.

Fewer cruisers were completed during 1933 than in any previous year since the War, but more were put in hand. Great Britain completed the Leander and Achilles; the United States, the New Orleans; and Italy, the Bolzano; no new vessels were completed for Japan or France. In 1932, no cruiser was completed for Great Britain, but the United States completed two, Japan four, France two and Italy six. Taking the two years together, there were completed two for Great Britain, three for the United States, four for Japan, two for France, and seven for Italy.

In Table A (p. 52) there is shown cruisers completed for the five principal Powers during the past thirteen years, indicating the regularity of cruiser construction in Japan prior to the London Treaty, the falling off in British cruiser building since the Treaty, and the rapidity with which Italy since 1930 has caught up with and overtaken France.

When the Orion and Neptune are completed by about the end of February, 1934, Great Britain will have a total of nineteen post-War cruisers, vessels laid down in or since 1919. When the Astoria, Minneapolis, San Francisco and Tuscaloosa enter service between February and April, 1934, the United States will have a total of twenty-three post-War cruisers. Japan has already a total of twenty-five post-War cruisers. Here is the cruiser situation in a nutshell. Any numerical superiority possessed by Great Britain lies in semi-obsolete and obsolete ships. The British construction programmes of the past fifteen years have not kept pace with those abroad. The Royal Navy has lived upon its War output, which for some time has been a dwindling asset, both absolutely

and relatively, by the growing age of the ships and the progress in design in other countries.

TABLE A.

	Great Britain.	U.S.A.	Japan.	France.	Italy.
1920	—	—	1	—	—
1921	1	—	4	—	—
1922	4	—	3	—	—
1923	—	6	3	—	—
1924	1	3	1	—	—
1925	1	1	3	—	—
1926	2	—	2	1	—
1927	—	—	2	2	—
1928	7	—	1	2	—
1929	4	1	3	—	2
1930	3	4	—	2	—
1931	1	3	—	2	4
1932	—	2	4	2	6
1933	2	1	—	—	1
	26	21	27	11	13

BRITISH CRUISER STRENGTH.

At the end of 1933, there were fifty-three cruisers on the list of the British Fleet, including those of the Dominions. This was two more than at the end of 1932, as the Leander and Achilles were completed and no further ships were scrapped. The gain is, however, more apparent than real, for whereas at the end of 1932 there were forty-three ships within the age limit (sixteen years) and eight above that limit, at the end of 1933 there were only thirty-nine ships within the age limit, and fourteen above it. Six cruisers reached the limit of age during 1933—the Caradoc, Caledon, Calypso, Ceres, Curlew and Cardiff—but remain on the list for want of replacements. An analysis of the list shows that the fifty-three British cruisers include the following :—

"C" class, completed 1915–1922, 3,895–4,290 tons, four or five 6-inch guns .	20
Brisbane and Adelaide (Australian Navy), 1916–1922, 5,120 tons, eight or nine 6-inch guns	2
"D" class, completed 1918–1922, 4,850 tons, six 6-inch guns	8
"E" class, completed 1926, 7,550–7,580 tons, seven 6-inch guns	2
"Hawkins" class, completed 1918–1925, 9,700–9,996 tons, six or seven 7·5-inch guns	4
"County" class, completed 1928–1930, 10,000 tons, eight 8-inch guns . . .	13*
"York" class, completed 1930–1931, 8,400 tons, six 8-inch guns	2
"Leander" class, completed 1933, 7,000 tons, eight 6-inch guns	2
Total . .	53

The problem of over-age cruisers, to which attention has been drawn in this chapter in past issues of the Annual, and which is brought about by a succession of years in which old cruisers reach their age limit at the rate of six a year, while new vessels are being built at the rate of only three a year, is now approaching a grave

* Includes 2 Australian Navy.

THE PORTUGUESE DESTROYER LIMA, 1,600 TONS.

Trials completed, September, 1933.

(*By courtesy of the builders, Yarrow & Co., Ltd., Scotstoun.*)

and critical stage. Two years more must elapse, 1934 and 1935, before the annual rate of replacement building begins to equal the wastage. Even a large building programme in 1934 cannot alter the fact that at any time during the next three years, from now until the London Treaty expires on December 31, 1936, this country cannot put into service more than from thirty-one to thirty-five cruisers within the age limit of sixteen years adopted at the London Conference of 1930. To make up even the reduced total of fifty cruisers for all purposes, reliance must be placed on over-age vessels worn out by past service, and outclassed by ships abroad. Many authorities have condemned the policy which will compel British naval officers and men to rely on such vessels. That the situation was foreseen and provided against is clear to anyone who examines the shipbuilding proposals adopted in 1925 after a Cabinet inquiry under the chairmanship of the late Lord Birkenhead. In a speech on February 4, 1926, Lord Bridgeman, then First Lord of the Admiralty, said :—

It could not be said that Britain was leading the race in naval shipbuilding; on the contrary, we were getting behind. It was essential that we should have ships which avoided the errors of construction revealed by the War, and which took advantage of the lessons of the War. This policy would in time give us a fleet of the most up-to-date cruisers. It was no use firing at sea against an enemy whose ships could out-distance and out-range ours, and it would have been a deception of the British people to have let them rely on a number of old ships that had been knocked about in the War and which could not possibly hold their own with the many new modern ships other Powers had laid down.

The following table shows the ships which have become due for replacement, but are retained in service; the names of those due to reach their age limit during the next three years; the names of the ships due to be completed for service; and the numbers of vessels left under the age limit in each year :—

CRUISER STRENGTH (AGE LIMIT 16 YEARS).

Ships under age	39
Ships over age (Comus, Champion, Castor, Constance, Canterbury, Cambrian, Concord, Brisbane, Caradoc, Caledon, Curlew, Calypso, Ceres, Cardiff)	14
Present total	53 ships.

Year.	Due for Scrapping (Age Limit 16 Years).	Due for Completion.	Total left under 16 Years.
1934	Curacoa, Coventry, Carlisle, Vindictive, Danae, Dauntless, Dragon	Neptune and Orion, authorised 1930	34
1935	Delhi, Dunedin, Cairo, Calcutta, Colombo, Hawkins	Amphion, Ajax, and Arethusa authorised 1931	31
1936	Effingham *, Frobisher *	Apollo, Phæton and Galatea authorised 1932 3 ships authorised 1933 (reduced from 4 ships, 14.11.33)	35

* Under the special provisions of the London Naval Treaty.

Owing to the slow rate of building, this country will need to retain on the effective list of cruisers in 1935 no less than nineteen cruisers of obsolete types even to make up a total of fifty ships, as the ships within the age limit in 1935 will number only thirty-one.

(*a*) Class Cruisers.

The present position in what were called (*a*) class cruisers in the London Treaty (those with guns of more than 6·1-in. calibre) is that Great Britain has nineteen; the United States twelve; Japan, twelve; France, nine; and Italy, eleven. Included in the British total are the four cruisers of the Hawkins class, which under Article 20 of the Treaty are to be disposed of before December 31, 1936. Included in the United States total is the old cruiser Rochester, which is on the disposal list. The Japanese total is composed of post-War ships only. The French total includes the old cruisers Waldeck Rousseau, Ernest Renan and Jules Michelet, and the Italian total four similar ships such as the San Marco. Eliminating all these War or pre-War vessels, the position is: Great Britain, fifteen; the United States, eleven; Japan, twelve; France, six; Italy, seven. Only two Powers have cruisers in this category under construction. France has one, the Algerie, laid down in 1931 and launched in 1932. The United States has five, the Astoria, Minneapolis, Tuscaloosa, San Francisco and Quincy. A sixth, the Vincennes, was ordered in August, 1933, under the Industrial Recovery Act, but may not be laid down, under the London Treaty, until January 1, 1934. A seventh, No. 41, may be laid down under the Treaty on January 1, 1935. This will give the United States by 1938 her full quota of eighteen cruisers in category (*a*) for which she asked at the London Conference, compared with fifteen British and twelve Japanese. The following table shows how the ships will compare in point of age:—

Cruisers in Category (*a*), with 8-inch Guns, completed in 1938.

	U.S.A.	G.B.	Japan.	France.	Italy.
New	1	—	—	—	—
1 year old	1	—	—	—	—
2 years old	1	—	—	—	—
4 ,, ,,	4	—		1	—
5 ,, ,,	2	—	—		2
6 ,, ,,	1	—	4	1	—
7 ,, ,,	3	1	—	2	3
8 ,, ,,	4	3	—	1	—
9 ,, ,,	1	4	3	—	2
10 ,, ,,	—	7*	1	2	—
11 ,, ,,	—	—	2	—	—
12 ,, ,,	—	—	2	—	—
Totals	18	15	12	7	7

* Includes 2 Australian Navy.

As will be seen from the above, half of the eighteen U.S. heavy cruisers will be five years old or less. Neither Britain nor Japan will have any corresponding cruisers of this age. On the contrary, eleven of the fifteen British cruisers and eight of the twelve Japanese cruisers will be between nine and twelve years old, or half-way or more through their allotted life.

(*b*) Class Cruisers.

An important event of the year was the entry of the United States into the building list of (*b*) class cruisers (those with guns of 6·1-in. calibre or less). All the U.S. cruisers laid down since the Washington Treaty had been 8-in. gun ships, of which type she has already availed herself of the maximum number under the London Treaty, as already explained. But advantage has been taken of the Industrial Recovery Act to order four cruisers out of the tonnage allowed in class (*b*), the Savannah, Nashville, Brooklyn and Philadelphia. These ships will be superior in power to any other cruisers in this category in other countries. The British "Leander" class are of 7,000 tons and carry eight 6-in. guns. The French "Jean de Vienne" class are of 7,600 tons, and carry nine 6-in. guns. The Italian have two similar ships building. The Japanese Mogami and Mikuma will be of 8,500 tons, armed with fifteen 5-in. guns. The U.S. ships of the Savannah type will be of 10,000 tons—up to the limit imposed by the Washington Treaty of 1922—and will be armed with fifteen 6·1-in. guns.

We see here the swing of the pendulum towards the heaviest and most powerful cruiser allowed by Treaty. When Great Britain, in 1927, laid down the York, in which the displacement was reduced from 10,000 to 8,250 tons; and Italy, in 1928, laid down the "Condottieri" class of 5,000 ton cruisers with 6-in. guns, there were those who foresaw a general withdrawal from the 10,000-ton limit, an artificial figure adopted at the Washington Conference after political reasoning rather than with regard to actual naval needs. As the foregoing particulars show, any withdrawal from the 10,000-ton limit has been only temporary, and what was intended as the maximum is now once again the general standard. Meanwhile, those Powers which, like Great Britain, have produced since 1930 cruisers of 7,000 or 5,000 tons, more suited to their individual needs, will find their fleets in the near future composed of vessels definitely inferior in size and power to the vessels now under construction in other countries.

Under-Age Ships.

The question of the age of ships becomes of increasing interest each year in connection with new building programmes, since manifestly the larger the proportion of old tonnage in a navy, the greater the reason for building new ships in replacement. After the United States had sanctioned the construction of thirty-two new vessels under the National Industrial Recovery Act, Mr. Swanson,

Secretary of the Navy, said in the Washington *Herald* for July 23, 1933 :—

Under the present programme, after including the 32 vessels just authorised, we will have built and projected in 1936, 108 under-age naval ships of all classes ; England will have built and projected in that same year 161 under-age ships ; and Japan will have built and projected 183 under-age ships. This means that unless we provide for further shipbuilding we will still be 101 vessels under treaty strength on December 31, 1936, the date of the expiration of the London Treaty. On that same date, according to present building plans, England will be only 64 ships under treaty strength and Japan will be up to full naval strength allowed by the Treaty.

The main factor in the total arrived at by the U.S. Secretary of the Navy is the many over-age destroyers and submarines in the American Fleet. There was such a huge surplus of the former type of vessel after the War that no destroyer was laid down from 1920 to 1932. On April 1, 1933, there were 281 vessels in the U.S. Navy over the age limits of the London Treaty, but 247 of them were destroyers and thirty-two were submarines. This fact allows of a large margin of tonnage which could be replaced by new, even after the large programme of June, 1933, is taken into account. So far as cruisers are concerned, Great Britain is debarred from putting in hand a programme similar to that of the United States, owing to the provision in the London Treaty (Article 20, clause (*a*)) that "the total replacement tonnage of cruisers to be completed, in the case of the British Commonwealth of Nations, prior to the 31st December, 1936, shall not exceed 91,000 tons (92,456 metric tons)." No other signatory to the Treaty was limited in this way. The 91,000 tons has been invested in thirteen small ships—chiefly "Leanders" of 7,000 tons and "Arethusas" of about 5,450 tons. The United States has kept to 10,000-ton ships, and is now adding four more. This she can do in accordance with the London Treaty because her cruiser strength at the time that pact was framed was very low, and the tonnage allowed her was such as to permit of a large amount of building. For her, the Treaty was one of rearmament rather than limitation and reduction. The growth in number of her post-War cruisers has been as follows : end of 1929, nine ; 1930, thirteen ; 1931, sixteen ; 1932, eighteen ; 1933, nineteen ; and by the end of April, 1934, twenty-three, with seven more building and projected.

Flotilla Leaders.

France received into service during the year some more vessels of the "Aigle" class, and there are now built or building twenty-four flotilla leaders of this type, all of which are above the limits of the London Treaty, to which, in so far as it relates to light craft, France did not subscribe. Under Part III. of the Treaty, cruisers are defined as surface vessels, other than capital ships or aircraft carriers, exceeding 1,850 tons displacement, or with a gun above 5·1-in. calibre. Vessels below these limits are classed as flotilla leaders. The twenty-four French flotilla leaders are of 2,436 to 2,569 tons, with engines of 70,000 to 74,000 horse-power, and speeds of 36–37 knots. Their main armament includes five 5·5-in. guns.

Contemporary British flotilla leaders are of 1,400 tons, 36,000 horse-power, 35½ knots, and armed with four 4·7-in. guns. Great Britain could not build similar craft to the "Aigle" class without deducting the tonnage from her allowance in cruisers, which, as has been shown, is already exhausted.

Destroyers.

While in the cruiser class, the British Government has provided for the amount of tonnage to which they are limited by the London Treaty, the matter is entirely different with regard to destroyers and submarines. In these classes, unless a substantial programme is authorised in 1934 and executed rapidly, the force available in vessels within the age limit will be far below even the tonnage allowed by Treaty. On this point, Admiral of the Fleet Sir Charles Madden, in a letter to the *Morning Post*, published on September 2, 1933, said: "We cannot increase our cruiser tonnage beyond the ships built, building, and in the programme of 1933, but the Government could lay down and complete by December 31, 1936, nearly 100,000 tons of destroyers and a large submarine tonnage. Some effort in this direction would greatly ease the cruiser situation when the London Treaty ceases to operate, and enable rapid cruiser expansion to be undertaken if desired." Lord Jellicoe, in his speech at the opening of Navy Week at Portsmouth on August 5, 1933, after referring to the enormous shipping losses which occurred in 1917, and which no nation could stand for long, said: "This went on for some months because we had an insufficient number of cruisers and fast destroyers to start a complete convoy system. It would be a very bad thing if ever that happened again. Yet in those days we had well over 100 cruisers, whereas now we had only fifty, and we had 350 destroyers, whereas now we had only 150."

Some statistical data prepared for the United States Naval Institute, showing combatant vessels on April 1, 1933, indicated that the British Empire on that date had forty-three destroyers of 56,974 tons under age, and 116 destroyers of 123,490 tons over age. More than two-thirds of the British destroyers were beyond the age limit. In the United States, the proportion of over-age vessels is even higher, owing to the flotillas being composed of destroyers of the large War programmes. There were on April 1, 1933, only four destroyers of 4,760 tons under age, and 247 destroyers of 262,710 tons over age. Japan has the highest proportion of under-age destroyers, as 70 per cent. of her total in this class is in vessels under twelve years of age. In the French and Italian Navies, the proportion is about 50 per cent.

Submarines.

The relative figures in regard to submarines have not varied very much during the past year. In point of numbers, France comes first with eighty-four completed vessels, the United States has eighty-two, Japan has sixty-two, and Great Britain fifty-six, with Italy, forty-

six, rapidly gaining on her. When the vessels now actually building are completed, Great Britain will drop from fourth to fifth place, as the figures will be: France, 109; United States, 84; Italy, 71; Japan, 67; and Great Britain, 62. Japan has the smallest proportion of vessels over the Treaty age limit of thirteen years from date of completion; only three out of her sixty-seven submarines were completed before 1921. Great Britain has twenty-three of her fifty-six submarines over age; the United States, thirty-seven out of eighty-two; France, twenty-six out of eighty-four; and Italy, seventeen out of forty-six. France and Italy, each with twenty-five submarines in hand, are far ahead of any of the other Powers in construction programmes in this class. These Powers are building more tonnage than would be needed merely to replace that which is now over age.

Aircraft Carriers.

It is significant that although the modern aircraft carrier is much criticised on the grounds of her expense and vulnerability, and that the system of using land planes over sea is condemned as too hazardous, yet both the United States and Japan have included two carriers in their new programmes. These, however, will be much smaller than former vessels, with displacement in the neighbourhood of 10,000 tons. The largest aircraft carriers in the world are the U.S. Lexington and Saratoga, each of 33,000 tons. Then come the Japanese Kaga and Akagi, each of 26,900 tons. Great Britain has four large carriers of between 22,450 and 22,600 tons.

Britain and America are each allowed 135,000 tons of aircraft carriers by Treaty. Great Britain has six vessels of 115,350 tons, and the United States has, including the Ranger (due for completion in the spring of 1934) four of 91,300 tons. Japan is allowed by Treaty 81,000 tons. Excluding the Notoro and Kamoi, seaplane carriers, she has four ships of 68,870 tons. No aircraft carriers are building or projected by France or Italy.

Coastal Motor-Boats.

The development of an improved type of French *vedettes torpilleurs* corresponding to the former coastal motor-boats in the Royal Navy, is a notable feature of the past year's progress. Great Britain did not continue the construction of this type of war vessel when hostilities ceased, and the last six C.M.B.'s passed out of service in 1930. They were vessels of 11 tons, 55 ft. long, with 750-h.p. engines, speeds of from 38 to 40 knots, and armed with four small guns, two depth charges and two torpedoes. The only Powers which have continued to build craft of this nature, so far as the larger navies are concerned, are Italy and France. In view of the spectacular success achieved by the Italians in the Adriatic, particularly in penetrating the defences of Durazzo, Trieste and Pola, the perpetuation of the class was natural, and in France the arguments in favour of such a type of vessel make a strong appeal to many officers. France has built about a score of coastal motor-boats since the War.

The latest type, built at Meulan, on the Seine near Paris, was tried in June, 1933. The displacement is 21 tons, and with engines of 2,000 h.p. the designed speed is 47 knots. The armament carried includes two torpedoes, and the crew numbers five. It is proposed to multiply the class in order to have flotillas available to co-operate in the defence of naval bases, particularly those in the Channel.

For some of their boats, the French have copied the design of Messrs. Thornycroft, who produced so many British C.M.B.'s with success during the War. Since 1918 this British firm has supplied coastal motor-boats to the navies of France, Japan, the United States, Siam, Sweden, Holland, Yugoslavia, Finland and Greece. For coastal defence, especially working in conjunction with aircraft, these boats make a strong appeal. It has been claimed that they can out-manœuvre any other type of fighting ship, and can twist and turn at such speed that bombing from the air would be rendered ineffective. A group of C.M.B.'s of 50 knots' speed, it is claimed, working in conjunction with reconnaissance aircraft, could attack within one hour of discovery any enemy ships within fifty miles of the coast.

Personnel.

The First Lord, Sir Bolton Eyres Monsell, gave in the House of Commons on March 29, 1933, the following approximate numbers of the personnel on the active lists of the American, Japanese, Italian and British Navies, with the increase or decrease per cent. such figures showed on the personnel of those navies at the beginning of 1914: U.S.A. 107,300 (60 per cent. increase); Japan, 88,000 (74 per cent. increase); Italy, 53,000 (32 per cent. increase); British Commonwealth, 98,100 (35 per cent. decrease). The First Lord added that in view of differences of organisation as between the several navies concerned, these numbers were not strictly comparable. On November 16, 1933, Sir Bolton was asked what were the approximate decreases or increases in the personnel of the naval forces of Great Britain, the United States of America, and Japan respectively at the present time as compared with 1914. He replied:—" In round figures, the United States, 39,700 increase; Japan, 40,000 increase (estimated); Great Britain, 55,000 decrease." There could scarcely be a more striking proof of the extent to which Great Britain has reduced her naval power in comparison with that of other countries.

G. H. Hurford.

CHAPTER IV.

The Disarmament Conference, 1933.

Dicaeopolis	You've brought the Treaties ?
Amphitheus	Aye, three samples of 'em—Here's a good vintage that may suit you —a ten years' truce.
Dic.	There's a sort of sourness in it, a taste of acid embassies turning to vinegar.
Amph.	Well, here's one of thirty years, warranted sound.
Dic.	Ah, that's the goods! I'm determined to keep out of the reach of wars and mischief.

Aristophanes : "The Acharnians."

The end of 1932 left the Disarmament Conference (opened on February 2, 1932) pondering over the French Plan of concentric circles of relative security, which could hardly hope to go forward in view of Sir John Simon's solemn affirmation that Great Britain had come to the end of unilateral disarmament, while in front of them stood Germany's claim to equality of status. On November 17, 1932, Sir John Simon had presented a British Plan with the following proposals as regards navies :—

For Capital Ships ...	Great Britain was seeking agreement for substantial reduction in guns and tonnage of the capital ship and of all naval tonnage—the aim being 22,000 tons instead of the present 35,000 tons.
For Cruisers ...	Limitation to 7,000 tons with 6-inch guns.
For Submarines ...	Total abolition.

The German claim to equality of status the British Government was prepared to meet conditionally upon the conclusion of a solemn agreement between all European powers that force would never be used to settle disputes * and under certain subsidiary conditions. So far as naval forces were concerned, any construction undertaken by Germany should not increase her total present tonnage in any category. In the case of submarines Germany's claim to equality of treatment would be best met by their abolition.†

Germany's Return, December, 1932.

Meanwhile every effort was being made to persuade Germany to return to the Conference, which she did on December 12, consequent on a Five Power Declaration of December 11, 1932, in which the Governments of the United States, United Kingdom, France, Germany, Italy, declared that "one of the principles that

* Declaration of Policy of His Majesty's Government on Disarmament, November 1932, Cmd. 4189.

† *The Times*, November 18, 1932.

should guide the Conference should be the grant to Germany and the other Powers disarmed by the Treaty of equality of rights in a system which would provide security for all nations."

Once more the Conference buckled to its task and discussion revolved round and round the question of standardisation of land forces on a basis of short service and of a limitation of the number of effectives, the French offering,* subject to sufficient security and supervision, the institution of a military service period of from eight to nine months—an offer which roused French militarists to frenzy.

The figures and arguments and counter-arguments with the tabulations and classifications of effectives present a ponderous mass of detail skilfully marshalled in a maze where one is apt to forget that all these figures are based on the conception that wars are caused by armaments and armed men, though the events of the last few years, sending a beam of light across our troubled councils, tell us more clearly than ever that the causes of war lie not in armaments but in national sentiment and economic necessity.

The League decision of February 24, 1933, against Japan on the question of Manchukuo was answered by the abrupt departure of the Japanese delegates with the announcement that "the co-operation of Japan in the Far East in the alleviation of Sino-Japanese differences was at an end." The incorrigible vehemence of our bellicose pacifists in their cry for the application of sanctions and for an embargo to be laid on the dispatch of arms to Japan roused a strong current of feeling in that country and will find its repercussions when the question of naval disarmament comes up for discussion in 1935.

Deadlock Again: Herr Hitler.

In March discussions in the Disarmament Conference had again reached a deadlock, the German delegation demanding a definite reduction in armaments while the French delegation was not prepared to express any opinion on the reduction or abolition of any particular weapon.

On March 9, 1933, Mr. MacDonald and Sir John Simon were again crossing the Channel in order to gain first-hand knowledge of the points at issue and try to stave off an adjournment. Two days later (March 11) came the announcement of the great electoral victory gained by Herr Hitler in Germany, where his advent to power stirred the dissatisfaction smouldering in German hearts into a blaze of national exultation, bound in its turn, however, to harden opinion in France and to aggravate the situation, for here, in spite of the plaint of the pacifists that armaments are the primary cause of an aggressive spirit, was a nation practically unarmed displaying all the symptoms of a warlike and aggressive spirit. It was hoped at the time that Great Britain, France, and the United States would be able to present a common front, but the United States delegates showed no sign of a desire to do so. It was left therefore for Great Britain to urge again the desirability of as large

* Geneva, February 17, 1933.

a measure of disarmament as possible, qualitative and quantitative in all categories of armaments, land, sea, and air, while France again made it equally clear that there could be no disarmament without a due measure of security.

British Draft Convention, March, 1933.

A complete breakdown could only be avoided by the production of a comprehensive plan, and accordingly on March 16, 1933, Mr. MacDonald presented a Draft Convention, running to some forty pages of typescript, under four headings :—

Part I. Security.
Part II. Land army forces; Material; Navy and Air armaments.
Part III. Exchange of information.
Part IV. Chemical Warfare.
Part V. Miscellaneous.

Part I, Security, was to be based on the provisions of the Kellogg Pact, providing for a Conference with conclusions definitely concurred in by the representatives of the Great Powers. The essence, however, of the Convention lay in Part II, which proposed to reduce all armies to a militia basis with eight months' maximum service, and presented a definite table of land armed forces for the nations of Continental Europe as follows :—

	Home.	Overseas.
France	200,000	400,000
Germany	200,000	200,000
Italy	200,000	250,000
Union Soviet Republics ...	500,000	500,000
Poland	200,000	200,000

A limit of 10·5 cm. (4·2 inches) was to be placed on mobile land guns and of 16 tons in tanks.

The problem of Naval Armaments was to be met by an extension of the Treaty of London (limiting cruiser forces) to France and Italy, and by the stabilisation of naval forces at the level of the Treaties of London (1930) and Washington (1922) until 1935, when the new Naval Conference would meet. Germany was to be freed from the naval limitation clauses of the Treaty of Versailles, though her position up to the end of 1936 was to remain as at present.

With regard to Air Armaments—Bombing from the air was to be completely prohibited, except for police purposes in certain outlying regions. The principal Air Powers—France, Japan, Italy, United Soviets, United States, and United Kingdom were to reduce their aircraft to 500. The Permanent Disarmament Commission was to draw up a scheme for the complete abolition of naval and military aircraft, and a Permanent Commission was to be set up to supervise the execution of the terms of the Convention.

Any signatory Power whose attitude might be the subject of criticism would be entitled to ask for an investigation, or at the request of any other Power the Commissioners might set investigations on foot. Any party who considered the provisions of the Convention had been infringed might address a complaint to the

Commission, who would ask the party complained of for an explanation. In the event of war any party might suspend temporarily the provisions of the Convention except :—.

(a) the rules laid down under Part IV of the Treaty of London,* which were to be accepted as established rules of International Law;
(b) the complete abolition of bombing (except for police purposes in certain outlying regions);
(c) use of chemical, incendiary, and bacterial weapons and all preparations for same.

Beginnings of Four Power Pact.

Such was the essence of the Draft Convention † of March 16, 1933, presented by Mr. MacDonald himself to the General Committee in a plain-spoken speech in which he asked if they had not had enough of enmities and war. The next day he and Sir John Simon started for Rome, where on March 18, 1933, Mr. MacDonald had a long interview with Signor Mussolini who presented a project ‡ to secure a guarantee of peace by collaboration between the four Western Powers.

At Geneva the discussion on the British Draft Convention opened on March 24, 1933. It was accepted as a basis for discussion and the Conference adjourned till April 25.

The idea of a Four Power Pact was not favourably received in France. M. Paul Boncour at Paris on March 27, 1933, insisted that it must be applied only within the framework of the League whose authority must be jealously safeguarded. "The Covenant, the whole Covenant and nothing but the Covenant remains the guiding principle of French foreign policy," said M. Herriot. The smaller powers of the Little Entente—Poland, Czechoslovakia, Yugoslavia, and Roumania—were equally suspicious of anything that savoured of Treaty revision, and a dark cloud of protest began to gather in the East. The Roumanian Prime Minister asked the British Government to note that Treaty revision would lead to war. The Little Entente made it clear that it would not consult with any committee of the Four Western Powers and that it would refuse to acknowledge any authority outside the League.

Check Again.

No sooner had the Disarmament Conference resumed its sittings on April 25, 1933, than it met with a sudden check—this time from America. Mr. Norman Davis announced on April 26 that he was not prepared to bind the United States to the principle of consultation. Collaboration for America would depend on the degree of disarmament achieved, which must be definite and substantial. Germany, too, took up an ominous attitude. Herr Nadolny put in an amendment asking for the limitation of armaments to the requirements of national security. He also proposed that the

* *Re* restrictions on submarine warfare.
† For text, see *The Times*, March 17, 1933.
‡ Later the Four Power Pact.

exception to the abolition of bombing warfare, which permitted it for police purposes in outlying regions, should be withdrawn. In the case of naval armaments, Germany was prepared, pending the Conference in 1935, to maintain the limit assigned to her at Versailles. Finally she asked for the deletion of the whole of Chapter 2 of Part II of the British Draft, providing for a standardised organisation for continental armies. As this was the essence of the British Draft, Germany's attitude produced another deadlock, which was hardened by the decision * of the Effectives Sub-Committee to include Nazi storm troops and "Steel Helmets" in Germany's effective strength.

Baron von Neurath was reported to have said that Germany must rearm, which evoked the response from M. Paul Boncour that "if there is no Convention, it is the Versailles Treaty † that remains in force."

The essence of the Convention lay in the reduction of the European continental armies to the basis of a defence militia. This meant the disbandment or conversion of Germany's present Reichswehr, consisting of 100,000 veteran soldiers. This conversion was apparently not to Germany's taste, and Herr von Papen, in a speech to the Nazis at Munster on May 14, 1933, pointed out that the battlefield was to man what motherhood was to woman, a statement not very encouraging to the Conference, though he was careful to soften it down by pointing out that the struggle against pacifism did not imply warlike intentions. Those, however, who heard him must have come away with the idea that if the end and purpose of man is the battlefield it is man's business to possess a warlike intention to lead him there.

Three days later (May 16) came a French Memorandum on the Four Power Pact emphasising the view that any efforts in that direction must be pursued within the limits of prior engagements, viz. Locarno, the Pact of Paris, the Declaration of Non-recourse to Force (December 11, 1932), and on the basis of the Covenant.

The same day came a message from President Roosevelt to the Heads of States taking part in the Economic Conference at London, judiciously silent as to any guarantee from America, but urging all nations to rally to the Draft Convention, asking that none should increase their existing armaments, and that all should enter into another solemn pact of non-aggression and solemnly reaffirm their obligations to limit and reduce their armaments.

On May 17, 1933, came a pronouncement from Herr Hitler in the Reichstag. It struck a cautious note. The Versailles Treaty was no solution of the world's problems. Germany's disarmament ought to have been the signal for general disarmament, but Germany was ready to accept every reduction that was universally applied; the Nazi storm troops were directed against Communism; Germany was ready to disband her entire military force and to destroy the weapons left to her if other nations would do the same. Thus Herr Hitler at Berlin. At Geneva things looked brighter on

* With eight abstentions, including Italy and the United States.
† The "sanction" of the Treaty being the reoccupation of the Rhineland.

THE FRENCH CRUISER COLBERT, 10,000 TONS.

Completed, 1931.

May 19, 1933, when at the meeting of the General Committee Herr Nadolny declared that Germany accepted the British Draft as a basis for discussion and was ready to discuss the conversion of the Reichswehr into a new short service force. Mr. Norman Davis presented the United States' proposals on May 22. He asked for a substantial reduction of armaments; accepted the British Draft whole-heartedly as a definite effective step, and approved of an international supervision of armaments; the United States was willing to consult with other Powers in the event of a threat of war but was not prepared to be bound by their decisions; last, but not least, in the event of her concurrence as to the responsible party the United States would refrain from any action tending to defeat collective effort to restore peace. In other words the United States would not insist on a strict interpretation of neutral rights in the case of those Powers who in her opinion were not responsible for the recourse to arms.

On May 23 M. Paul Boncour somewhat disturbed the harmony by insisting on France's two conditions of Security and Control of Armaments. He did not want offensive weapons destroyed; they should be retained for the use of the League, a proposal which led one cynic to suggest that the huge unfinished building of the League would come in handy as an arsenal.

On May 24 Sir John Simon presented a revised British Draft, stipulating that in the event of a breach of the peace an immediate consultation may be proposed by members, as well as non-members, of the League, between the Council or Assembly and the parties at issue. On May 26, in the House of Commons, he summed up the situation, stressing the point that Great Britain had already effected immense reductions "but could go no further without general agreement." It was no part of British policy to assume further obligations. In France Sir John Simon's speech stirred up a chorus of disapproval, for there the Boulevards still nurse the belief that Great Britain is the Great Britain of August, 1914, rich and ready to enter into some vast and illimitable guarantee for the accomplishment of the great task—the maintenance of peace, and the Peace of Versailles.

On May 25 Japan put in a suggestion towards a revision of the Naval Treaties of Washington and London, and as the way was not clear for a "second reading" of the Draft Convention, the Conference was adjourned till July, 1933.

Equality of Rights.

Over the Four Power Pact, too, there was a bad hitch, for Germany took strong exception to Article 3, dealing with the question of equal rights. A new draft tended to remove the objection. Briefly, the High Contracting Powers would consult together over difficult points of the Covenant and would make every effort to ensure the success of the Disarmament Conference. Meanwhile conversations were proceeding on disarmament between the representatives of Great Britain, France, and the United States—France

asking insistently how security was going to be guaranteed, the United States asking how far existing armaments were to be reduced.

June 12, 1933, saw the opening of the World Economic Conference by His Majesty the King. It had barely opened when President Roosevelt's uncompromising message made it clear that America was going to pursue an economic policy of her own—an attitude not too auspicious for Conferences, whether in London or Geneva. On July 7, in a House of Commons Debate on Disarmament, Sir Austen Chamberlain stated that "until Germany convinced the world that a reasonable revision of the Peace Treaty would content her, no friend of peace would consent to any revision at all, nor indeed to any pressure on her neighbours to disarm"—in other words that peace in Europe at present rests not on disarmament but on the French Army and the British Navy. During July Mr. Arthur Henderson was busy in Paris, Rome, Berlin, and Prague with conversations and direct negotiations on the points still unsettled, viz. the abolition of heavy land material, naval and military aviation, and the supervision and control of armaments.

On July 15, 1933, the Four Power Pact * was signed at the Palazzo Venezia at Rome. It had brought about a very notable conciliation between Italy and France. On July 27 the World Economic Conference closed "for a recess." Its attempt to solve a knotty problem in terms of international action had not proved successful.

By September, 1933, the French attitude had crystallised. France could not accept any diminution whatever of her armed forces at the present time under present conditions, but if a system of permanent and automatic control was instituted and proved effective over a period of years, France would be ready to make large reductions. Great Britain, however, could offer no further guarantees; she had, in Sir John Simon's words, shown her willingness to go to the limit of sacrifice and "to the edge of the risk." And, indeed, it may be added that if the edge of the risk at Locarno ever began to crumble, Great Britain might find herself in a very unpleasant and precarious position.

Contrôle and Sanctions.

Much discussion followed as to the method of control, the length of the probationary period, the procedure of investigation, and the question of sanctions in the event of a breach of the Treaty. About the middle of September the French were suggesting that a breach of the Locarno Treaty had already supervened in the form of drilling and assemblage of men near the Rhine bridgeheads, and that Great Britain and Italy were even then under an obligation to join France in enforcing a respect for it. This question of *Contrôle* remained one of the thorniest obstacles in the path of further progress. The British proposal was that investigations should only take place when called for, but any such system would be bound to meet again

* See Cmd. 4342, Despatch to H.M. Ambassador at Rome, June 7, 1933.

with all the evasions and obstacles which obstructed the Inter-Allied Commission in the past—this time, however, in an aggravated form, for in Germany, at least, the published official figures from which much information was gleaned are no longer issued, and in every nation any betrayal of official information has become a criminal offence. To a distinguished member of the old Inter-Allied Military Commission of Control the British proposal of occasional inquiries appeared impracticable.*

The French, on the other hand, maintained that the supervision of armaments must be regular, and towards the end of September this view was more or less accepted by Great Britain and France, and a trial period was suggested of four years.

There remained, however, the old difficulty as to the form and application of "sanctions," for Great Britain refused to pledge herself to apply force, and France considered that any Convention devoid of definite penalties would be valueless. The position at the end of September was briefly as follows: Great Britain was pressing for a definite statement of the degree of disarmament to be attained. Germany had put in a demand for "prototypes" or specimens of the weapons prohibited to her under the Treaty of Versailles. The French were laying stress on the necessity for sanctions, for a limitation of armaments at the present level until the expiry of a trial period and for some definite guarantee of security. *Contrôle* by itself was regarded in France as absolutely valueless and illusory.†

On the question of "prototype" weapons French opinion was specially sensitive to anything in the form of rearmament by Germany. The main interrogatives confronting the Conference were:—

(*a*) What reduction did the Great Powers propose to make in their forces? (Great Britain and United States.)
(*b*) How soon would the destruction of heavy material be begun by the Powers which possess it? (Germany.)
(*c*) How long was the period of probation to be? (France, Great Britain, Italy.)
(*d*) What sanctions were to be applied in the event of a breach of the Treaty? (France.)
(*e*) What definite guarantee of support could contracting parties furnish?
(*f*) Was Germany to have any armaments prohibited under the Treaty of Versailles?

On October 6, 1933, the views of the German Government were communicated to London and Rome. They reflected an uncompromising attitude. Germany consented to the continuance of the Convention for five years, but would not accept any probationary period. In accordance with the principles of equal rights, arms allowed to other countries should be allowed to Germany.‡ In short, Germany asked for immediate equality of status, so far as types of weapons were concerned. That same day (October 6) Mr. Baldwin, speaking at Birmingham, declared that England would fulfil the obligations she had undertaken. In Berlin it was stated

* J. H. Morgan, K.C., *The Times*, September 22, 1933.
† M. Tardieu in *La Liberté*.
‡ *Echo de Paris*, October 19.

that Germany was confronted with a suggestion for a probationary period of eight years divided into two sub-periods of four years.

The Bureau of the Conference met at Geneva on October 19. Mr. Henderson stated that he had visited various capitals and conversed with the heads of Governments, and was of opinion that no serious difficulty stood in the way of agreement. There was agreement on the question of non-recourse to force; on the definition of an aggressor; on control and supervision; on the standardisation of European continental armies; on bombing from the air; on the setting up of a Disarmament Commission and on naval questions.* Amongst the difficult questions were the period of duration of a first stage Convention; size of tanks and artillery; reduction of land war material; military and naval aviation, and penalties for violation of the Convention.

On October 11 Sir John Simon was at Geneva and opinion was evidently hardening against Germany being allowed to rearm. On October 14 Sir John Simon stated that in the opinion of the British Government agreement could not be reached on a basis of Germany receiving immediate permission to rearm. The Draft Convention which was intended to cover a period of five years would require to be recast. The period should be extended to "perhaps eight years" with a continuous programme securing two essential conditions:—

(a) A special measure of disarmament actually realised and completed on the part of the heavily armed Powers.
(b) The achievement of the principle of equality in the regime of security.

The scheme involved the principle that the Powers under restriction should not begin to increase their armaments forthwith. Mr. Norman Davis for the United States, and M. Paul Boncour for France announced their agreement. Italy, too, agreed in the main. The Conference had barely risen when it received a sudden and unexpected shock. Germany, "deeply humiliated by the deliberate refusal of a real moral and actual equality," announced her withdrawal from the League and from the Conference. The Reichstag was dissolved and a General Election called for November 12. Baron von Neurath on October 16 gave as the grounds for this action that fundamental alterations had been proposed to the original Draft. Sir John Simon in a broadcast on October 17 stated that recent events in Europe had so increased the feeling of nervousness that some modification had to be made in the British plan, while M. Deladier the next day asked why, if Germany was prepared to scrap her last rifle, should she not accept a sincere scheme which would mean a real step towards disarmament.

The crisis in the Conference has demonstrated the danger of pressing disarmament too far. Great publicity is given to the plea that the Powers have incurred a specific obligation to disarm, and on the strength of this plea Germany has insisted on being granted equality of status. It is unnecessary to quote the texts because

* I.e. till 1935.

they have been so often quoted.* It can be stated quite definitely that there never was any specific undertaking on the part of the Allied Powers to disarm to any precisely stated level. The most that can be said is that, in legal phrasing, there was something of the nature of a contract to induce a contract, but there was no definite promise on the part of the Allied Powers as to the extent or time of disarmament, and Great Britain certainly can claim that she has in the Washington and London Treaties, and in the all too great reductions of her army and air force, fulfilled the shadowy obligations that existed.† If the other Powers have not gone so far, it is their business, not ours. It is foolish to be constantly trying to convert France, for France, possibly with reason, thinks that she knows her own business better than English pacifists can do. The whole scheme of disarmament is based on the co-operation of Germany, for if France and Poland are to start disarming, it is essential that Germany should remain disarmed. All that has happened, however, is that Germany is insisting on the disarmament of France, in other words for equal armaments, though equal armaments where there is no "moral" disarmament must mean an approach to war. The equality may commence at zero or in terms of bows and arrows, but this will not prevent the factory wheels starting to revolve at full speed on the declaration of war.

There is another strong argument against excessive zeal in the cause of disarmament. The fervent apostles of that policy are always urging us to go farther than France, but in urging France to disarm we place ourselves in the position that, in the event of her taking any big step towards disarmament on our inducement, we become more or less bound by obligations of honour to help her in a crisis. Thus, while increasing the danger of involving ourselves in a European quarrel, we continue to diminish our powers of defence. France is perfectly logical in asking for guarantees of security, and indeed right through the years of negotiations she has held consistently to the policy of insisting on some definite guarantee of help as a condition of disarmament. This is not possible for us, however, for no Government of Great Britain can give an unlimited guarantee. They can set the Navy and Army in motion, but where is one to find the four million men to follow them? These men are moved by words like "King and Country," but they will not be moved by words like Bessarabia or the Saar. Three millions of men are not going to be forthcoming for the defence of any European frontier, not because they are unsympathetic towards France but because in their minds first things come first. Great Britain cannot afford a continental war. What was true of 1684 is true of 1933—England cannot undertake unlimited responsibilities and place the whole Empire in jeopardy for the sake of a problematical security in Europe. This does not mean a policy of isolation; it means a policy of common-sense independence.

There is another point. In 1911 we abandoned the second

* Article VIII of the Covenant; Part V (Military Clause) of Versailles Treaty, and Clemenceau's letter of June, 1919.

† J. W. Weigall, *The Times*, October 19.

strategical policy of waging war primarily by sea. We allowed ourselves to be entangled in the web of a vast and faulty plan which we did not even know, and bound ourselves to the wheel of a continental war, directly contrary to the principles of our old maritime strategy in the past.

There is another danger in continental guarantees. It is extremely difficult to harmonise them with one another or with any definite Imperial or naval and military policy. For instance, let us suppose that under the Locarno Treaty (a policy of Guarantee) we are faced with a call to assist Germany against France. But under the London Treaty with a different end in view (a policy of Disarmament) we are so weak in destroyers and cruisers that it may be seriously doubted if we could afford effective help at sea.

The events of the last year have demonstrated conclusively that "moral" disarmament must precede material disarmament, and as Great Britain is powerless to influence the minds of Europe in this matter, it is futile to go on urging material disarmament. The more we urge, the more bound we are to help in the event of trouble, but we cannot urge others without disarming ourselves and making ourselves less able to help in the day of trouble. The pacifist policy forces us to revolve in a thoroughly vicious circle.

The more ardent advocates of the League are terribly desirous of giving it a force sufficient to intimidate any power in the world. It is this idea conflicting with the idea of Disarmament that gives rise to their sudden somersaults of policy; at one moment they are calling for peace and disarmament and the next demanding sanctions and war with Japan. The League is to be ready to wage war anywhere with a force ready to go anywhere. But where is such a force, of say five million men, to be recruited? Who is to be its Chief of Staff? Where are its planes, tanks, and howitzers to be parked? Where is it to be assembled? The whole conception is, in the present stage of the world, an extravaganza. Nor is it possible to classify weapons into the hard-and-fast categories of offensive and defensive, which are purely relative terms, depending on circumstance and motive, not on size.

Still less can "militarism" be ascribed to "armament" firms, so called, which have evolved only to meet necessitous needs of national defence. It is not the single armament firm, but the spirit of a nation conjoined with its ultimate industrial capacity as a whole that determines its final fighting power. It is the urgency of imperative need that transforms the industries of peace into industries of war. The great destroyer-building firm of Thornycrofts started on its career by building yachts.*

It is prophesied that if the Disarmament Conference breaks down, Europe will be heading for a devastating war. It is permissible to doubt it. Europe is not in an economic position to go to war. The real safeguard against continental war lies in the economic situation, in the French Army and Air Force, and in the British Navy.

The subject of Disarmament was debated in the House of

* See letter, "What is an Armament Firm?" Sir John Thornycroft, *The Times*, November 8.

Commons on November 7, and in the debate Sir John Simon emphasised the fact that our armaments had been reduced to the lowest point to which we could go by unilateral action. In the case of the Navy the number of capital ships had been reduced from 69 to 15, cruisers from 108 to 54, destroyers from 215 to 152. Aircraft had been reduced to little more than 20 per cent. the post-War strength. The British Government stood for international co-operation with a view to firmly established peace and were, without any qualification, believers in and upholders of the League of Nations as the best available instrument for international peace. This belief in the efficacy of the League of Nations as at present constituted is, however, far from universal, for in Italy the Fascist Grand Council have announced * that the continuance of her membership will be dependent on its radical reform. The pathetic belief of British sentimentality in the power of persuasion and in the obsolescence of the power of force, finds small confirmation in the world as it is. In the United States, Mr. Claude Swanson, the Secretary for the Navy, has pointed out that their weakened position has not served the cause of peace. This is equally, or still more, applicable to ourselves. Amongst the strongest exponents of pacifism may be found rich men and women whose wealth has long ago been made in spacious times in markets taken and held by force.

> Though Justice 'gainst Fate complaine
> And plead the ancient rights in vaine,
> But these do not hold or break
> As men are strong or weak.
> * * * *
> The same arts that did gain
> A power must it maintain.

Unilateral Disarmament is, in fact, nothing more than sentimental madness. And, indeed, it may be doubted whether anything can be gained from discussions dealing with disarmament alone. The basis is too narrow. The Conference, when it meets again, will certainly find a serious rival in Mussolini's plan of direct negotiations, presumably on a much broader basis, between the interested Powers

At the root of the whole conception of disarmament lies the idea (often conjoined with the old anti-militarist complex) that war is largely caused by armaments, and that the abolition or reduction of armaments will usher in a golden age of peace. If Japan reduced her armaments to nil, would that reduce to zero the Chinaman's hatred of Japan ? If France disbanded her army, would Germany's desire for the Saar vanish away ? Is there no fighting among Chinese generals with any old Martinis that can be furbished up for use ? The fact is that the causes of war lie deep down in economic strata and in the self-hood of the individual man. The thin-lipped, white-faced little pacifist pouring out his plaint is in his heart more aggressive than the field-marshal whom he denounces. It is natural that those who have drunk of this potent draught of internationalism should be profoundly influenced by it. They are pathetically anxious to get rid of the nationalism which lies at the root of war.

* December 6, 1933.

and then presumably they will get rid of the self-hood of the individual which is the real *nidus* for the microbe of strife.

But are their ideas in conformance with reality? That is the crucial question. The essence of tragedy lies in a deceit caused by an obsession. The obsession may assume a guise wondrously lustrous, and shining as an ideal of peace, but its potency for harm remains just as great, if it does not conform to life. Nothing finer than the Tsar's ideals of peace, but they were not true to life and led him to revolution and death. Nothing shabbier than Walpole's ideals, but they were true to life and kept peace in Europe for a generation. The advocates of pacifism are fatally susceptible to the obsession of an alluring plan. Too many of them are afflicted besides with that terrible possession, a presumptuous intellect; they are quite certain that the moment has arrived for internationalism to take the place of nationalism, but as Masefield said of Richard III, "Being certain is in itself a kind of sin sure to be avenged by life."

ALFRED C. DEWAR,
Captain, R.N.

CHAPTER V.

Physical and Recreational Training.

Despite the fact that some of the world's most famous men have been able to rise above the affliction of an ailing body, and to have become the greater for this very reason, it is universally acknowledged that, in the mass, physical fitness and high morale go hand in hand. No one has realised this fact better than the Board of Admiralty, whose duty it has been to maintain in its highest efficiency the " Navy, whereon, under the good providence of God, the wealth, safety and strength of the Kingdom chiefly depend."

In the days of sail, bodily fitness was a natural attribute of the man-of-war's man. His daily life, aloft or on deck, always in the open air, heaving, climbing, hauling, developed not only a body of steel and whipcord, a courage and agility so necessary to his profession, but a sense of team work and reliance on his superiors and comrades, where the mistake of one would lead to the death or injury of a score of his shipmates. The advent of steam and mechanical appliances in the place of masts and yards necessitated the work of our ships being carried out more and more between decks and in enclosed spaces, resulting in an insufficiency of fresh air and exercise for the ships' companies, less reliance on each other and an apathetic trust in coal and iron. While mechanical efficiency, speed, seaworthiness of ships, radius of action were enormous advantages, the evil effects of these improvements on the morale of the personnel were speedily evinced. In those days there was a complete lack of recreational facilities ashore, and the large majority of liberty men, finding nothing else to do, drifted into the nearest public-house as soon as they landed, and progressed from house to house with the inevitable result. Now, whilst liquor, particularly good ale, does little harm to the man of iron physique who can only partake of it at infrequent intervals, to him who leads a more sedentary life it performs a very different action. The sailors returned to their ships with the effects of good food, and possibly not such good alcohol, heavy upon them, with no strenuous exercise to work off the ill effects, and not the least inclined to " turn to " again. This tended to lead to an increase in crime, both petty and serious, and to a general lowering of self-respect and morale.

It became essential for the general well-being of the Navy that this state of affairs should be remedied, and My Lords took action. Firstly, it was decided to introduce a system of Physical Training for all boys, new entries, etc., to attain a high standard of physical fitness with which to start their service life; secondly, to introduce

physical exercise as a part of the ship's daily routine; and thirdly, to encourage recreation ashore.

In 1888 volunteers were called for to become "Gymnastic Instructors," and a qualifying school was started at Whale Island, at Portsmouth, which may be called the home of naval shore training, and from whence so much for the good of the Service has emanated. Part of the qualifying time was spent at Aldershot in the Army School, and the Navy must always be grateful to the sister service for the ready and willing help in those days and the close liaison and friendship which has been continually maintained between the branch in the two services in the ensuing half-century. The instructors thus trained went out to the fleet and establishments, and this method of instruction continued until 1900, when the Admiralty decided that gymnastics should become a specialist branch of the Royal Navy. The training comprised horizontal and parallel bar work, dumb bells, bar bells, vaulting, boxing, club swinging, etc., and it gradually became apparent that while these methods did in fact develop body control, courage and build muscle, they did, in many cases, have the latter effect to a definitely harmful degree. The man who is heavily muscled about the chest, cage and abdomen suffers, with increasing years, from a limitation of the movements of the internal organs and a consequent loss of endurance and enlarged heart, amongst other evil effects.

THE SWEDISH SYSTEM.

This state of affairs could not be allowed to continue, so in 1902 the late Admiral N. C. Palmer, who was then a Commander and Superintendent of Gymnasia, was directed to examine and report on various methods of bodily training in vogue at the time. His researches drew him in due course to Sweden, where he spent some time studying their methods of training in naval, military, and civil establishments, and his report induced the Admiralty to introduce the Swedish system into the Navy. A start was made at the R.N. Barracks Gymnasium, Portsmouth, when classes of officers and ratings were trained by a Swedish Professor, Mr. Alan Broman, and the system thus taught, adapted for, and developed by the requirements of the Service is the basis of the Physical Training side of the branch to this day.

While to Admiral Palmer is due the credit of discovering the most suitable method of training, Admiral Sir Hugh D. R. Watson must be considered the "Father" of the branch, for not only did he develop and organise the physical training as such when he succeeded Admiral Palmer in 1905, but, as will be seen later, his was the brain and energy which started, by the direction of "My Lords," the Sports Control Board, which is the keystone of naval recreation.

Until 1910 the Naval School of Physical Training was located in the Royal Naval Barracks, Portsmouth, but in 1908 it was finally approved that a separate establishment should be built on land acquired from the War Department, as the headquarters of the

THE BRAZILIAN TRAINING SHIP ALMIRANTE SALDANHA.
A Painting showing her appearance when completed.
(By courtesy of the builders, Vickers-Armstrongs, Ltd.)

branch. Completed at a cost of about £15,000, the existing headquarters School was opened at Portsmouth on September 22, 1910. It comprises a gymnasium of the following dimensions:—length, 160 feet; breadth, 60 feet; and height, 40 feet. It is equipped with every appliance required for the practice of Swedish gymnastics, a lecture room with rising tiers of desks to accommodate forty pupils, a swimming bath 83 feet by 30 feet, large and well-ventilated dressing-rooms, showers, etc., and excellent office accommodation for the Superintendent, Medical Officer, and Staff. The building adjoins the R.N. Barracks' recreation ground, on which is what is probably one of the best running tracks in the country, and here the classes have the benefit of open-air instruction and training when weather permits.

By 1914 the School had achieved a very high standard of efficiency, not only in turning out fit and efficient instructors well versed in the correct methods of obtaining and maintaining physical efficiency in their pupils, but in the physical and athletic ability of its members, and skill-at-arms was making rapid strides. One of the staff, Lieutenant E. W. W. Brookfield, achieved a European reputation as a sabreur, but in August of that year, owing to the fact that every member of the naval personnel was required elsewhere, the School was closed down.

Introduction of Recreational Training.

In 1918 it was decided that more instructors were required to train the continual flow of new entries, to replace vacancies in the fleet, and to maintain the very necessary physical and moral efficiency of the personnel. Commander B. T. Coote, an officer of great experience in physical training and vast energy, was directed to re-open the School with classes of R.N.V.R. leading seamen, the only ratings available at that time. Commander Coote had retired some years previously to 1914, and rejoined in that year; he had studied in Sweden, and had invaluable experience as a teacher both at Harrow and Eton. From his brain emanated the idea that while physical training was a necessity in the young, physical exercise and recreational training was what was required for the fully grown officer and man, and while our instructors must be prepared to build up the bodies of our boys and correct minor defects, their work with the fleet must be an even more important part of their duties.

On June 1, 1918, a Lieutenant-Commander who had been on the staff in July, 1914, was sent down to Portsmouth to assist Commander Coote.

When every section of the Navy was considering its reorganisation for post-War purposes, a conference of all officers who had a knowledge of the P.T. Branch, assisted by two distinguished gunnery officers from the establishment at Whale Island, was held in January, 1919, at the School, and their report strongly supported the necessity for recreational training, and advocated the creation of the head of the branch and a central sports committee at the Admiralty.

This met with the entire approval of the Admiralty, and, in due course, My Lords of the Treasury were brought to realise that there would be value for money expended. As a result, the First Lord of the Admiralty, in submitting the Naval Estimates to the House in March, 1920, was able to state " A special section has been set up at the Admiralty to supervise Physical and Recreational Training in the Service. It is also part of its duty to promote the organisation of sports and games, and with this end in view a Sports Control Board has been set up at the Admiralty, and various Sports Associations and Local Sports Committees have been formed." Thus the head of the branch, a Captain, and his deputy, a Commander, were established at the Admiralty, the School being in charge of a Commander assisted by an adequate staff. Later a Captain was appointed to the School, and finally, when the Directorate of Personal Services was set up at the Admiralty, it was found possible, while retaining the Directorate of Physical and Recreational Training at the Admiralty, to amalgamate the duties of Director of the branch and Superintendent of the School, the Assistant Director remaining at the Admiralty for the necessary liaison, to deal with immediate matters, and to act as Secretary of the Sports Control Board.

The duties of the Director of Physical Training and Sports are as follows :—

To supervise physical and recreational training, Naval skill-at-arms, boxing, swimming, athletics, etc.

To advise as to purchase and supply of gymnastic gear and all apparatus appertaining to physical training, sports and recreation.

To advise on all matters relating to recreation grounds and recreational facilities.

To advise and arrange for the work of the Royal Naval and Royal Marine Sports Control Board.

Representation on, and work connected with, committees of all Naval sports organisations.

Co-ordination with Army and Royal Air Force organisations.

Maintenance of sports and games of the Naval service in close touch with the civilian bodies to which they are affiliated.

To represent the Royal Navy on such organisations as the Committee of the British Olympic Association, etc.

The officers and instructors of the branch are taught the Swedish method of physical training, and receive a good grounding in anatomy and physiology connected with the work. They also learn how to teach boxing, fencing, bayonet fencing, rowing, swimming, diving, life-saving, athletics, self-defence ; and how to organise and run meetings, regattas, etc. ; also the rules of all outdoor games, particularly Association football and hockey, in the former of which they are expected to qualify as referees. With reference to anatomy and physiology, very close touch is maintained with the medical profession, and there has always been a doctor on the staff of the Superintendent of the School, without whose advice no change in the exercises or methods of teaching them is introduced.

The instruction of the personnel, officer and rating, commences with the new entry, and the instructor at the training establishment is faced with the necessity of building up the young bodies—underdeveloped and frequently ill-nourished—with the greatest care by

carefully chosen, graded and progressive Swedish exercises. After instructional hours his duty is to teach and supervise the recreations of the youngsters, inculcate and foster a spirit of sportsmanship and that very necessary correlative, the team spirit, which is the nucleus from which emanates a happy ship, a smart squadron and an efficient fleet.

At sea an instructor's duties are somewhat different, for he still has the physical training of the younger officers and ratings to undertake without the assistance of the apparatus provided in a gymnasium. Fortunately, however, to a fertile brain a ship provides an infinite variety of apparatus which can be applied to these requirements. For the remainder of the ship's company, who are fully developed, he provides physical and activity exercises which are designed to enable the adult to retain the full activity of his limbs, muscles, and internal organs, so necessary to health and well-being. In the " silent hours " he becomes the adviser and mentor on all sports and recreations, the organiser of sports and games, the teacher of young boxers, runners, fencers, etc., and the trainer of teams where experts at such work are lacking.

Each fleet and squadron carries an officer employed wholly or partially on the staff of the Flag Officer Commanding, whose duties, apart from the general supervision of physical training, are to control all squadron recreations, undertake the allocation and maintenance of grounds appertaining to the Fleet, organise all competitions and officiate and provide officials at the many meetings which are part of the seasonal routine of the Navy, wherever it may be. So specialised have games become in this post-War world that these officers need to have a very intricate knowledge of the rules of the games and the laws of the various parent associations which control sport in civil life, and to which the Navy associations are affiliated with great benefit to the Service.

The Sports Control Board.

The Royal Naval and Royal Marine Sports Control Board was formed in 1920, to give financial and other assistance to our various sports associations, and to act in liaison between them and their parent civilian bodies and with similar organisations in the Army and Royal Air Force. The affairs of the Sports Control Board are now administered under a scheme approved and established, on May 16, 1930, by the Charity Commissioners for England and Wales. The Assistant Director, Physical Training and Sports, is Hon. Secretary of the R.N. and R.M. Sports Control Board. The Board has a Branch Committee in every Home Port and in the Fleets both at home and abroad. These branches are known as Port or Fleet Sports Committees, and refer matters of importance to the central body.

The main principles upon which the Sports Control Board works are :—

1. To encourage recreation—both indoor and outdoor—amongst the personnel, not only for the selected few, but for the masses.

2. To ensure that sports and games shall be made as far as possible self-supporting.

3. To deal with all financial matters relating to sports and recreations, both indoor and outdoor, of officers and men which are not a legitimate claim on public funds.

4. To assist financially, by means of free gifts or loans:
   (a) Ships on commissioning (in the case of small ships a small additional grant is allowed).
   (b) Drafts proceeding to a foreign station.
   (c) Any unit which is unable to provide immediately recreational gear through lack of funds.

Ships or units wishing to take advantage of these facilities apply to the honorary secretary. The financial assistance it is possible to render the various units depends upon the annual income of the Board. That the Board has, since the date of its formation, been enabled to accumulate a not unsubstantial capital fund is a matter for satisfaction, in that a certain assured income is provided towards the objects in view. It cannot be overlooked, however, that a large part of the accumulated fund was derived in the early years of the Board's activities from sources which will not again be available; and, in view of the increasing number of appeals for assistance received from Sports Committees throughout the Service, the example set by those ships and establishments which have already made donations is being followed by many others, and both officers and men remember the Sports Control Board when disposing of surplus funds, on a ship paying off, etc., etc. The more money the Board possesses the greater good can it do for the recreation and welfare of the personnel.

Between the date of its formation in March, 1920, and March 31, 1932, the Sports Control Board has disbursed for the recreations of officers and men, as free grants £24,500; as loans (without interest) £24,000. In addition, the Board has purchased a recreation ground at Devonport for use as a Rugby football ground by officers and men at a cost, with reconditioning, of about £9,000.

Sir Hugh Watson's Task.

When Captain H. D. R. Watson was appointed to the Admiralty to form this enormous organisation, he was backed by the entire goodwill of the Board, but he was faced with what to most men would have seemed to be an unscaleable barrier, the fact that no money could be obtained from public funds.

Indeed, no money has ever been received by the Sports Control Board from public funds during the thirteen years of its existence.

The history of how the first small sums were gathered in is never likely to be known, for it lies in the brains of two men who sat down in an empty office and started to make bricks without straw. Captain Watson was fortunate enough to procure an assistant in Engineer-Commander E. W. Roberts (later Engineer Rear-Admiral Roberts).* These two officers, by dint of unfailing tact and indefatigable hard work, proceeded to interest individuals, ships and holders of

* The untimely sudden death of this officer on November 19, 1933, was a distinct loss to the Service.

funds, until at last the foundation was laid of the £56,000 which is approximately the sum in the Accumulated Fund at present. (The Lower Deck provided one of the first considerable sums, for they voted £5,000 to the Board in the very early days.) Satisfactory though this achievment is, the interest on this sum is small indeed to cope with the many recreational requirements of Britain's wide-spread fleet in every quarter of the globe.

These officers were morally courageous as well as determined to succeed; they built as they proceeded, for they knew that only by results could they prove the value of their work, and many times must they have been faced with the possibility of all their structure tumbling about their ears for want of financial backing. This article is not the place to detail the work involved in the formation and building of the Board. Suffice it to say that Captain Watson formed the Board, with the assistance of Engineer-Commander Roberts, and turned it over as a running concern to the first Director of Physical Training and Sports, Captain R. C. Dalglish, R.N., in April, 1920, Roberts remaining until the summer of 1923 as Assistant Director and Secretary of the Sports Control Board, when he was succeeded by the present Director, who was then a Lieutenant-Commander. Since 1920 there have been nine Directors, while the fifth Secretary of the Sports Control Board since Roberts has just taken office.

All recreation grounds in the Service, with the exception of the Rectory Field, Devonport, are provided from public funds, and a certain sum allocated for their upkeep, but all refinements and improvements, provision of gear, etc., is the work of the Sports Control Board. It is obvious that, in addition to his knowledge of physical training and games, a P.R.T. Officer or rating must have a knowledge of grounds and their upkeep; the wise purchase of sports gear; the requirements of every type of ship, whether at home, abroad or trooping; and, what is more important than all, the mental attitude of officers and men towards the maintenance of a healthy body, which in its turn leads to a healthy mind and consequently the high morale which is the first essential of an efficient Service.

Some Results of the Training.

It may be asked if there are any outward and visible signs of the results of this training compared with its small cost. The answer is to be found, firstly, in what the public see in the blue-jacket, whether it be in some inland village during the leave period or in the home ports during Navy Weeks and other times when it is their good fortune to come in closer touch with the personnel of their first line of defence. They see a man clean, healthy, alert, fit both in mind and body, and, especially when in foreign ports, by his appearance, carriage and bearing a very worthy advertisement of the manhood of the Empire which he has the honour to represent and serve. Secondly, annually at the Royal Tournament and on other occasions, the public have the opportunity of seeing the

agility, discipline, and team work displayed by officers and ratings of all sections taught by instructors of the branch. Thirdly, while the aim is to provide benefit for the masses and not for the specialists, the Navy has a long record of players who have distinguished themselves in the realms of sport. Fifty officers and ratings have obtained International Rugby Caps, and England has been captained six times by Navy players.

Admiral Percy Royds, who is a Past-President of the Rugby Union, was one of the first officers to go in for physical training, and was Superintendent in 1908, succeeding Admiral H. D. R. Watson, and later succeeding Rear-Admiral R. C. Dalglish as Director in post-War days; he obtained caps for England in 1898 and 1899, while Engineer Rear-Admiral E. W. Roberts and Commodore G. H. D'O. Lyon, who both captained England before joining the Branch, have been Assistant Director and Director respectively. In later days Commander C. A. Kershaw and Lieutenant-Commander W. C. T. Eyres for England, Lieutenants C. H. Abercrombie and A. E. Thomson for Scotland, and Lieutenant-Commanders C. F. G. T. Hallaran and Harry Stephenson for Ireland, were all Physical Training Officers.

In the Association game, which of late years has improved by leaps and bounds, the Navy has had its fair quota of amateur internationals, Lieutenant D. G. Cornelius, R.M., being the Physical training representative in this sport. In fencing, besides Captain E. W. Brookfield, who tied for first place in the international sabre championship, the branch has been represented in international matches by Rear-Admiral R. C. Dalglish, Major W. K. Garnier, R.M., and Commander C. A. Kershaw; while Lieutenant-Commander E. A. Mount Haes and Q.M.S.I. F. A. Peasnell, R.M., have fought in international military tournaments at the Hague, the latter winning the N.C.O.'s championship in 1931. Many other officers and ratings would have represented the country but for the exigencies of the Service. Perhaps the greatest distinction won in this game was a special gold medal awarded to Admiral Dalglish at the Olympic Games in 1924 for "Good Sportsmanship." What higher award could be gained in the realms of sport, and what greater advertisement for the objects of the branch?

Among the seven naval officers who hold international hockey caps, the physical training branch is represented by Major R. A. D. Brooks, R.M.; and this officer, with Lieutenant C. H. Abercrombie, Commander A. K. Gibson, Commodore G. H. D'O. Lyon, Commodore A. E. Evans, Lieutenant-Commanders S. Boucher and E. L. D. Bartley are amongst those who are connected with the branch who have represented their counties at cricket—indeed, the last-named kept wicket for a touring side which visited South Africa. In the realm of athletics, Petty Officer J. P. Finch, Leading-Seaman J. Tillman, Lieutenant-Commanders Mount Haes and D. M. L. Neame are amongst the P.R.T.I.'s who have represented their counties, and the latter represented Great Britain as a hurdler in the Olympic games.

The emoluments of those who undertake this work are not

great while they are serving, but there is an increasing demand for their services in the civilian world where experience of organisation and dealing with all types is required. Schools, establishments, and businesses are realising the value of this work, and such an enormous organisation as Imperial Chemical Industries has obtained the services of an ex-Assistant Director, Commander D. J. Claris, R.N. Commander A. G. A. Street is and has been for many years at Rugby School. Chief Petty Officer W. G. Howson and two ex-naval ratings as assistants are at Eton College, and Chief Petty Officers P. Henning and D. H. Martin at the Nautical College, Pangbourne. These are but one or two of the many educational establishments which appreciate the value of the very high-class instructor, imbued with the right spirit, who is obtainable to undertake work such as director of welfare, games master, groundsman, club caretaker, instructor of either P.T., games or swimming, or any other occupation which demands trust, integrity and loyalty.

The Finished Article.

While the Specialist on leaving the Service finds an excellent outlet for his talents, the fortunate employer who secures his services does not realise always that for every instructor who takes his pension there are many hundreds of fit, loyal, highly disciplined young men between the ages of thirty and forty who come on to the labour market after between twelve and twenty-three years of the finest training imaginable. They are not only ready and willing to take up employment in civil life, but what is more important, to give service for salary and play the game for the side which offers them occupation.

In the production of the finished article, to use the expression in two senses, the trained officer or rating, or the time-expired man or pensioner, whether it be for the good of the Service or the employer of labour in civil life, the Physical and Recreational Training Branch claim to have a great share. While it cannot be considered one of the very important fighting specialist sections such as those concerned with gunnery, torpedo, signals, etc., yet without a healthy, happy, and virile personnel the work of these branches would be of little value. Two verses from Admiral Hopwood's well-known poem, " Our Fathers," may well be quoted here :—

Now there may be " too much Nelson," for the times have changed since then,
But as long as man is human we shall have to count on men ;
Though machines be ne'er so perfect, there may come a day, perhaps,
When you find out just how helpless is a heap of metal scraps.

* * * * * * *

In an age of swift invention it is frequently believed
That the pressure of a button is as good as work achieved ;
But the optimist inventor should remember, if he can,
Though the instrument be perfect, there are limits to the man.

Robert L. Burnett,
Captain, Royal Navy.

CHAPTER VI.

THE BUILDING OF A CRUISER.

THE building of a cruiser to-day is approached over very different grounds from those traversed in days gone by. When the War broke out, in 1914, the standard light cruiser was the Birmingham type of 5,440 tons, 25,000 h.p., 25·5 knots speed, armed with nine 6-in. guns, four 3-pdrs. and two 21-in. submerged torpedo tubes, the cost of the complete ship being about £350,000. The experiences of the War led to the building of various types of cruisers of increasing size, power, and speed in quick succession, as detailed in Brassey's Annual for 1919. After the War the Washington Conference imposed limits on the displacement of cruisers; and the London Naval Treaty, 1930, limited the aggregate tonnage of new cruisers of the Powers taking part in the Conference, with the result that the naval architect is beset to-day by all kinds of new conditions, and above all a desperate demand to provide the utmost fighting capacity on the most moderate displacement and cost.

THE BIRMINGHAM AND LEANDER COMPARED.

It will be of general interest to compare the Leander, the 6-in.-gun cruiser of to-day, with the Birmingham, the 6-in.-gun cruiser of 1914. The particulars of these ships compare as in the table below. The increase of 2,000 tons in displacement has been accompanied by an increase of no less than 7 knots in speed and of about £1,250,000 in cost.

	Birmingham.	Leander.
Year laid down	1912	1930
Year completed	1914	1933
Length, b.p.	430 ft.	522 ft.
,, o.a.	457 ft.	554 ft. 6 ins.
Breadth	49 ft. 10 in.	55 ft. 2 in.
Mean draught	15 ft. 10 in.	16 ft.
Displacement	5,440 tons	7,140 tons
Fuel on load draught	650 ,,	—
Total stowage, coal	1,150 ,,	—
,, ,, oil	260 ,,	1,800 tons
Horse-power	25,000	72,000
Maximum speed	25·5 knots	32·5 knots
Armament	9 6-in. guns	8 6-in. guns
,,	1 3-in. A.A.	4 4-in. A.A.
,,	1 12-pdr. field gun	4 3-pdrs.
,,	4 3-pdrs.	—
,,	2 21-in. Sub. T. Tubes	8 T. Tubes on deck (quadruple)
Cost	£353,437 (including guns £20,300)	£1,627,819 (excluding guns £40,000)
Where built	Elswick	Devonport
Machinery by	Hawthorn, Leslie & Co.	Vickers-Armstrongs, Barrow

Armament.

The armament, on paper only, looks very much the same, the nine 6-in. guns and four 3-pdrs. of the Birmingham have been replaced by the eight 6-in. guns, four 4-in. A.A. guns, and four 3-pdrs. in the Leander. This nominal comparison gives no indication of the vast increase in the value and cost of the armament of the Leander, nor of the multifarious demands which it makes upon the ship designer. Gun for gun, each weapon is far superior, and, in addition, while the 6-in. guns of the Birmingham are hand-worked, those of the Leander are power-worked, enclosed in protected turrets, involving increased spaces right down to the magazines, and tremendous increases in weight and cost. The 4-in. B.L. anti-aircraft guns demand most elaborate mountings, good ammunition service, substantial supports, etc., again making great demands on space, weight, and cost. The list of particulars also gives no indication whatever of a feature of the design which carries with it the most far-reaching consequences in regard to demands for space, weight, and cost in construction, namely, the development of aircraft.

Development in Aircraft.

During recent years aircraft development has been rapid; extended experience has been obtained with them for naval purposes, and the types now supplied to the Fleet Air Arm are larger, heavier, and of appreciably greater speed than those of 15 years ago. The simple flying-off platform has become useless for such types of aircraft, and a catapult is needed for their discharge from ordinary warships. To enable these aircraft to be sent off on either beam, and with the ship at rest, the catapult has to be of appreciable length, its mechanism of substantial power, and generally it must be of the training type. It is obvious it must be placed at an elevated position in the ship to enable the wings of the aircraft when catapulted to clear all obstacles in the vicinity. Cranes of considerable outreach have to be fitted to hoist the seaplane from the sea on its return to either side of the ship, and replace it on the catapult. Concurrently, accommodation is required for the flying officers, the aircraftmen, aviation spirit, stores, and spare parts.

Anti-Aircraft Armament.

Consequent on the introduction of aircraft as naval weapons, it has been necessary to develop a defensive armament to meet them, and this has gradually become more powerful in calibre and numbers as experience in the operation of naval aircraft has been extended. It is probable this defence has not yet reached a final stage. As the guns for such a purpose must have a large angle of elevation, they are generally not efficient for other purposes, for which low elevations only are required, and thus in capital ships two types of auxiliary armament are at present fitted, one as defence against torpedo craft and the other against aircraft. In cruisers the

auxiliary armament is of the anti-aircraft type. In the British Navy, at present, guns of 4 inches calibre are accepted for this purpose.

As a result of these developments—aircraft for attack and guns for defence against them—the position of the main armament has been forced towards the ends of the ships, as in the pre-Dreadnought capital ships, and to secure the numbers required, twin, or in some foreign navies triple, turrets have had to be adopted. The mounting of the main armament along the middle line over the midship two-thirds of the length in single transferable mountings, as in pre-War cruisers like the Birmingham and those which followed, has necessarily been departed from, and this difference is at once apparent in comparing the disposition of the main armament in the Birmingham and Leander. Besides occupying the waist of the ship, and leading to a radical alteration in the disposition of the main armament in this manner, the extra weight required for these new features is very considerable, and makes a fresh problem for the designer.

Although all the main armament has been driven out of the middle portion of the ship, room has still been found for eight torpedo tubes, mounted for revolving in groups of four.

Wireless Equipment.

Another very important and obvious feature largely developed in the modern warship is that of wireless telegraphy and telephones. During the past eighteen years there have been very rapid and extensive developments in these forms of signalling, and whereas in the Birmingham and her sister vessels one single office of no great dimensions was sufficient for the then latest installation, several spaces each of nearly the same deck area as the single office in the Birmingham must be arranged for. To the layman with a receiving set which occupies little space and weight the wireless installation on a warship would be a revelation, for not only must it be capable of receiving messages on many different wave-lengths, but it must also have the apparatus and appliances for transmitting messages efficiently over the distances required on similarly varying wave-lengths. The warship is, in fact, a veritable Broadcasting House.

The development of this provision adds very perceptibly to the weight to be carried; it necessitates two masts of considerable height for long distance transmission and reception; it adds considerably to the demand for spaces for housing staff as well as the apparatus; and it adds materially to the total cost of the ship. It should also be mentioned that full advantage has been taken of all the modern advances in telephone work, and complete systems of telephones and exchanges are fitted in the ships. Just one instance may be mentioned of the extra wireless requirements. The aircraft require special systems of communication. In the first place, the ship must despatch messages to control their movements, and in the second place the ship must receive messages from them as to their position, and reports as to their observations.

[Photo by W. Ralston, Glasgow.

THE BRITISH CRUISER ACHILLES, 7,000 TONS.

Commissioned for Service, October 10, 1933.

(By courtesy of the builders, Cammell, Laird & Co., Ltd.)

Propelling Machinery.

In regard to machinery, the change from coal to oil has been in many ways to the advantage of the ship. Deck space for coaling and all the attendant discomforts and dirt of the coaling operations are gone. The oil fuel is supplied to the bunkers through fittings on the ship's side, or on the decks, and so makes very much less demand as regards space and weight. Corresponding savings in weight and cost of bunker doors, buckets, rails, etc., arise, but the cost is more than offset by the cost of oil fuel installations, pumps, pipes, burners, etc. The nominal displacement of H.M.S. Birmingham, 5,440 tons, included 650 tons of coal. In addition, she could carry another 500 tons of coal and about 260 tons of oil. The standard displacement of the Leander, 7,140 tons, is exclusive of fuel. In considering the increase of 7 knots in the maximum speed and a great increase of the cruising radius, it must be remembered this " endurance " can be maintained with no great exertion on the part of the engine department, an advantage which did not apply to coal, which required considerable sustained labour on the part of the boiler-room personnel. The developments of the last twenty years in the design and production of propelling machinery are perhaps as important as any others. Although the horse-power of the machinery has been increased from 25,000 to 72,000, and the maximum speed from 25½ to 32½ knots, the total length occupied by the machinery in the two types is about the same, and the total weight required for the machinery of nearly three times the power is only increased by about 30 per cent.

Endurance under Attack.

The manifold experiences of the War, 1914–1918, showed that those light cruisers which had been fitted with shell-burster plating on the outside of the ship, could venture into a severe fight and sustain a great number of blows from shell without sinking. They also showed great endurance when subjected to attack by torpedoes. Broadly speaking, it may be said that the methods of construction and protection adopted generally in those vessels with such great success have been maintained in the new types. In considering risks of attack further attention must now be given to defence against aircraft. Definite provision must be made in the new cruisers for defence against attack by explosive bombs, by torpedoes dropped from aircraft, and by gas bombs. All the additional structures for control, and all the various sections of the armament have therefore to be constructed definitely to resist these attacks, and machine guns have been re-introduced and fitted on bridges, etc., to prevent the very near approach of aircraft.

Preparations for defence against gas attacks have led to the reconsideration of the means of access into the ship and of all facilities for ventilation, so that in case of a gas attack being imminent all except essential openings can be closed up. Provision must be made also for preventing the entrance of gas, so far as may be

possible, through openings such as for access to turrets, etc., and the necessary messenger communications. Air supplies to machinery spaces, funnel uptakes, etc., must at all times be available, but the protection of such spaces from chemical warfare attacks is still an unsolved problem.

Hull—Strength and Lightness.

To secure the high speed desired a great length of ship was necessary, the length to beam ratio being 10 : 1, and length to depth 17 : 1, or perhaps more. The latter ratio results in very great stresses due to bending and shearing when passing over waves. A gale will soon bring up waves 500 ft. long and 12 to 15 ft. high in the Atlantic near our coasts, and in passing over such waves at a high speed trouble would arise unless the stresses in the hull amidships were very carefully calculated and provided for. Towards the ends the plating needs to be thicker than mere bending stress would demand to provide for corrosion, to prevent panting and buckling as the vessel drives into the sea, and to meet all the shocks and vibration as the vessel " kicks her heels " over the waves, and some or all the blades of the rapidly revolving propellers get momentarily clear of the water and then strike it with great force, causing very great reaction stresses. A somewhat amusing illustration of such reaction occurred some years ago, when a well-known racing motor-boat entering Cowes Harbour encountered a few steep waves, due to tide. For a moment, only one of the blades of the propeller was immersed; this was held by the water, and the torque of the engine drive on the screw shaft turned the ship round and she sank upside down.

In order to meet the structural stresses with a minimum of weight of hull, large quantities of " D " quality steel have been used, of the quality described by Sir William J. Berry in his paper on H.M.S. Nelson (I.N.A. 1929). This is distinctly superior to the H.T steel available when H.M.S. Birmingham was built, as shown by the following table :—

Class of Steel.	Ultimate Tensile Strength. Tons per sq. in.	Elongation in 8 inches not less than	Elastic Limit. Tons per sq. inch not less than
Mild	26 to 30	20 per cent.	Doubtful
High tensile . . .	33 to 38	17 ,,	17
" D " quality . .	37 to 44	17 ,,	17

As in the case of H.M.S. Nelson, aluminium sheets and section bars, with small castings of light metal alloys, were used for a variety of purposes such as divisional bulkheads for bath rooms and wash places; ventilation trunks; linings on ship's side in cabins; dressers, racks, cupboards, etc., in kitchens, galleys and store rooms. In some of the store rooms aluminium or steel-faced plywood was used for minor divisional bulkheads. As in H.M.S. Nelson, also,

considerable weight was saved by the extensive use of plywood in cabin furniture of every kind instead of solid wood. The plywood was fitted on skeleton frames of wood, and the whole of the wood was fire-proofed by the Oxylene process. Similarly, fire-proofed wood was used for all kinds of purposes throughout the ship, including mess tables and stools, deck planking which was not laid on steel plating, and minor divisional bulkheads not of importance for strength purposes. A very substantial saving of weight was also effected by the use of Borneo white hardwood for deck planking instead of teak. This class of wood was also used instead of mahogany for portions of furniture in order to save cost.

Further considerable savings in weight of hull were secured by a very extensive use of welding in place of riveting for securing minor fittings, for securing stiffeners to bulkheads, and for many other places where angle bars would be riveted in to secure watertight work. For details of this work, reference should be made to a paper read by Mr. C. S. Lillicrap, R.C.N.C., at the Institution of Naval Architects in 1933. It is of interest to note that the "D" quality of steel is successfully welded.

Other minor items contributing to reduction of weight are the use of cast steel of better quality; watertight doors made of thin, embossed, steel plates without stiffeners; boats' davits made tubular instead of solid; and lighter forms of lagging. Aluminium also contributes to saving of weight in another very different direction, viz. in the form of aluminium paint. In many internal positions one coat only of this paint is given instead of two or three coats of usual oil paints, and in other places a grounding of this paint is given in place of the old-fashioned coating of red-lead paint. Spray painting and spray polishing of the fireproofed wood furniture are also largely adopted.

As a matter of interest, although weight is not sensibly affected, monel metal and stainless steel are used on tops of tables in kitchens and cookery departments, though not to such a large extent as in recent liners.

Accommodation.

Improvements in standards of living ashore and improvements in standards of accommodation for the crews of merchant ships have also found their parallel in the Navy. Successive Boards of Admiralty have had before them the great desirability of improved habitability in ships not only for officers, but for all ranks and ratings. To secure efficiency in the working of all the multifarious and complicated types of apparatus now carried in the shape of armament, machinery, wireless, etc., the men who have to operate them must be of the very best type obtainable. Every effort is made to provide improved accommodation absolutely up to the limits possible within the steel walls of the ship.

On account of the number of specialist departments, additional offices are necessary, so that while the Birmingham had one ship's office and one engineer's office, cruisers and larger warships now have about a dozen offices for various purposes, and the number is

constantly increasing. Similarly, the number of special or enclosed mess places for different groups of subordinate and petty officers, with their provision-rooms and pantries, is steadily increasing. A visitor acquainted with a ship like the Birmingham would, on visiting H.M.S. Leander, be at once struck by the extraordinary increase of enclosed spaces on the mess decks. Besides the messes there are canteens, canteen stores, soda-fountain bars, reading-rooms, book-stalls, and recreation-rooms. Gymnastic gear is provided, and one ship in each squadron has a dental surgery.

The cooking, kitchen, etc., arrangements are highly developed, very free use being made of electrical appliances now available. Electric bread-baking ovens are provided in place of coal or oil-fired ranges with steam-tube ovens. Electrically driven mincing machines and potato peelers are provided in the kitchen, and electric toasters in the officers' messes; but one mechanical bacon and meat-slicing machine survives. Electric heaters and radiators are provided in the wardroom, the gunroom, and in the several officers' cabins.

During the progress of the design and building of H.M.S. Leander every item of construction and equipment has been reviewed. Fittings of every kind have been scrutinized and re-designed to secure the highest efficiency and the maximum reduction of weight. New materials and methods have been freely used as already indicated, but many other items would deserve attention if space permitted, such as under-water signalling, echo sounding gear, motor boats instead of steam boats, and electrical appliances for increased numbers of subsidiary purposes.

Progress and Price.

During the course of the War technical developments proceeded at an unprecedented pace. The men of science, naval constructors, and engineers taking part in all this progress were—when War ended—in a position which enabled them not only to maintain that high rate of progress, but to embody in the new progress lessons of the War. The development of improved materials for shipbuilding, such as high tensile steel, aluminium and aluminium alloys, already referred to, has been accompanied by the increased use of tools of precision for manufacturing purposes, and more highly developed handicraft whereby work may be carried out with great degrees of accuracy, thus enabling the use of thinner and lighter materials. This progress has combined efficiency with reduction in weight, but has inevitably been accompanied by increased cost of production, consequently the rate per ton of the hull structure in such a ship as the Birmingham is very different from that of the hull structure for such a ship as the Leander. Roughly speaking, it may be said that the hull and protection of the Birmingham cost £60 a ton to build as against £120 a ton for the Leander.

Where the Money Goes.

The Navy estimates give the cost of the Leander as £1,628,000 (excluding guns), the ship being built at Devonport Dockyard. It

would, however, be a great mistake to suppose that this money will be spent in Devonport and district. Looking more closely into the figures, the sum of £487,000 is shown as dockyard work, but of this £217,000 is for materials, practically all of which will be spent far away from the port. On the other hand, there is a very large item —£198,463—under the head of "Establishment, etc., Charges," and it must be presumed that a fair proportion of this money will be spent in the locality. These charges, however, include payment for the large quantities of coal, oil, gas, etc., used in the Constructive, Engineering, Electrical and other departments of the Dockyard, as well as workshop machines and motor vehicles. These items would be obtained from outside the town, and so involve the distribution of portions of the sum named.

Under the heading of "Contract Work" the totals amount to £942,000. To that must be added the sum for materials, £217,000, making a total of £1,159,000, which is virtually broadcast over the manufacturing districts of England, Scotland, Wales, and Northern Ireland. It would be very interesting to follow the distribution of this money over the country. Although this is not practicable, it may be possible to give a rough indication of what happens. The sum under the machinery heading is £430,000, and the order for the propelling machinery went to Messrs. Vickers-Armstrong's at Barrow. A large proportion of this was no doubt spent at Barrow-in-Furness, but appreciable amounts were most probably paid out to many other districts such as Newcastle, Birmingham, and Glasgow for auxiliary machinery, and for supplies of all kinds both of material and fittings. Under the head of "Hull" another sum of £83,000 was provided for smaller contracts placed by the Admiralty; the items are not detailed.

Returning now to the figure of £217,000 which is shown for materials for building the ship. It is to be noted that none of the Royal Dockyards are situated in a manufacturing area. This leads to many difficulties on the labour side, as there is no large pool of labour to permit the ebb and flow of workmen as in the great private shipbuilding centres, and it also means there are practically no local establishments where materials, fittings, and outfit can be purchased. In the case of a ship ordered to be built at Glasgow, a large proportion of the item "materials" would be spent within the district, but the dockyards must go elsewhere. In the case of Government Departments tenders are obtained for the various fittings and materials from an approved list of firms, so that the lowest prices offered can be accepted. How does this money go? A chart showing in colour the distribution of the money would contain many surprises.

In regard to the structure of H.M.S. Leander, probably about 30 per cent. would be spent on steel castings, steel plates, steel bars, rivets, etc., of the various qualities required, distributed most likely between Glasgow, Sheffield, Darlington, Middlesbrough, South Wales and Barrow-in-Furness. Possibly the cost of anchor and cable gear, steering gear, ventilation, pumping, ship fittings in connection with the guns and torpedoes, timber materials, canvas, paint, ropes, rigging, etc., and for fittings incidental to work of

this description would account for, say, another 30 per cent. Large sums would also be expended on electrical cables and armament equipment, motor generators and transformers, switches, fuses, switch-boards, etc. Large portions of this expenditure would go to Norwich, Manchester and London. Bedford and Belfast would come in for shares of the electrical appliances and ventilating fans. Greenwich would probably have a good order for electric cables and so on. Probably orders would go to Cambridge for scientific instruments and appliances, and to Chester for hydraulic piping, valves, etc., while orders for boats might go to Southampton and the Isle of Wight, and portions of wood for these boats would come from the Highlands of Scotland. Large orders for metal fittings for pumps, refrigerating machines, brass fittings, etc., would be distributed probably to Deptford, Dartford and Glasgow; and Glasgow and Newcastle would probably share orders for capstan and windlass gear, rangefinders, steam, electric and hydraulic steering gears. Newcastle, Sheffield, Barrow, and Manchester would share the money for guns, gun mountings, armour, and special qualities of steel. Birmingham, Coventry, Crayford, and Sunderland would share orders for many miscellaneous small fittings of all descriptions. It will thus be seen that large numbers of towns benefit by the expenditure of this money.

Roughly summarising the whole position, it may be said that of the total of £1,628,000 for building such a ship as H.M.S. Leander at Devonport Dockyard, approximately one-fifth would actually be spent in that district, one-fifth in the Barrow district, one-fifth in the factories and works in the Clyde, Tyne, and Tees areas, one-fifth in Manchester, Sheffield, and the Midlands, and the remaining fifth widely scattered over almost numberless country towns and villages with London. This is perhaps a very rough and inexact summary, but it will enable the reader more easily to realize that when an order is given to build a ship in a Royal Dockyard four-fifths of the sum voted is distributed over many towns which are remote from the district in which the ship is built.

Review.

After the Washington Conference, 10,000 ton cruisers were built of the Kent and London classes of 32¼ knots speed, carrying eight 8-in. B.L. guns, four 4-in. A.A. guns, etc., but when the aggregate tonnage of cruisers to be built also became fixed by the London Naval Treaty, 1930, it was necessary to reconsider the whole problem so as to provide what was necessary on the absolute minimum of displacement in order to obtain as many vessels as possible of the types built.

After inquiries ranging over several years, involving the preparations of many alternative designs, the Leander class was developed, and in these very remarkable and, it may be said, handsome vessels of 7,000 tons practically all the requirements of the London class of 10,000 tons are called for, and met, with one chief exception, namely, that they carry eight 6-in. guns instead of

eight 8-in. guns. There are, however, distinct additions in the way of aircraft, anti-aircraft, controls for all guns and for aircraft. The maximum speed is higher, although the horse-power is reduced from 80,000 to 72,000. The production of vessels of the Leander class on 7,000 tons must therefore be regarded as a veritable triumph of naval architecture.

The total cost of H.M.S. Birmingham, including guns, was £353,000, while the corresponding cost of the Leander class is about £1,667,000. Of this increase it is somewhat startling to observe that the cost of guns, gun mountings, and torpedo tubes has increased from about £50,000 in the Birmingham, to nearly £500,000 in the Leander, while propelling and auxiliary machinery have increased from about £135,000 to £435,000. The increase on these two items comes to more than double the original first cost of the Birmingham, and indicates the very high degree of development of all mechanical appliances. On the hull side the cost has increased from about £165,000 to about £650,000, so that while the cost of the armament has been multiplied by 10, and the machinery by about 3·5, the cost of hull and protection is less than four times that of the Birmingham.

Notwithstanding these increases in expenditure, a comparison of the costs of British and foreign warships of this type—and, indeed, of all types—shows conclusively that at the present time they are built appreciably more cheaply per standard ton of displacement than in any other country in the World.

J. H. NARBETH.

CHAPTER VII

British Warship Building Resources.

Comparatively few members of the general public realise the extent of Great Britain's contract warship-building industry. It is assumed, for instance, that its activities begin and end with the construction of the hulls and propelling machinery of battleships, cruisers, destroyers, submarines, and fleet auxiliaries, when as a simple matter of fact the Admiralty also depend upon it for the material of hulls and engines, including armour and special steels, guns of many calibres, gun mountings and a multitude of fittings for use in engine and boiler rooms and on deck. Even the machinery, armour and armament for dockyard-built ships are provided by contractors on the Admiralty List.

When operating at full pressure the industry employs about 40,000 skilled, semi-skilled and unskilled workmen within the shipyards and marine engine shops alone, in addition to at least double that number in other industries, making some 120,000 men affected in all. An examination of the details of materials of a recent warship shows materials, machinery, and fittings drawn from more than sixty different towns in Great Britain, ranging from Aberdeen in the North to Southampton in the South, and from Norwich in the East to Taunton in the West, and covering almost every county in the country. Millions of pounds are invested in the plant and machinery of the shipbuilders who specialise in naval craft. These firms also devote large sums of money annually to research—even in slack times like the present—in order to maintain the highest possible technical efficiency. Admiralty standards of workmanship are, as the world knows, exacting, and British contractors have the skill, experience and equipment necessary to conform with them.

In the immediate pre-War period warship work accounted for 25 per cent. of the employment in the British shipbuilding industry, but to-day, even with the 1931 and 1932 programmes going through simultaneously, the tonnage of warship work in the private yards is little more than one-seventh of what it was just before the War. For the four pre-War years the total of warship tonnage under construction in Great Britain, according to the official figures of Lloyd's Register, ranged from 73 ships of slightly over 400,000 tons in March, 1911, to 93 ships of 604,000 tons at December, 1913. The private yards at that time were called upon to provide four to five times the number of ships allotted to the Royal dockyards. The following table shows the number and tonnage:—

Date.	Private Yards.		Royal Dockyards.		Total.	
	No.	Tons Displacement.	No.	Tons Displacement.	No.	Tons Displacement.
31st Dec., 1911 . .	58	347,665	9	61,090	67	408,755
30th June, 1912 . .	54	380,763	13	122,240	67	503,003
31st Dec. ,, . .	69	342,035	15	154,840	84	496,875
30th June, 1913 . .	74	402,449	14	132,190	88	534,639
31st Dec. ,, . .	77	442,341	16	162,460	93	604,801
30th June, 1914 . .	76	458·175	14	134,370	90	592,545

Since the War, Lloyd's Register have not given figures in regard to warship work, but the tendency has been, in relation to the curtailment of the naval programmes, for a greater proportion of the work than in pre-War times to be concentrated in the dockyards because of the necessity of having skilled and trained personnel available there for dealing with repairs, modernisations, and re-equipment.

The success of the British contract industry in fulfilling the requirements of their own national naval authority has had the effect of attracting to it many foreign orders. At the moment, war vessels are under construction at Barrow and on the Clyde and on the Tyne for Portugal, and since the Armistice destroyers have been built at Cowes for the Argentine, at Southampton for Chile, and on the Clyde for Yugo-Slavia. Submarines and a depot ship were lately built at Barrow for Chile, and when the War broke out battleships of the Dreadnought type were under construction in the North of England establishments for Chile, Brazil, and Turkey. In earlier days, capital ships were built in this country for Japan, Russia, and Brazil, and cruisers for Spain. Most of the world's principal maritime Powers have, in fact, at some time or other depended on British contract yards for their fighting ships, and in no instance has the confidence in British designs and workmanship been disappointed.

The Naval Defence Act in the early 'nineties brought about a large increase in the number of Admiralty contractors, and greatly extended the area on which the Admiralty could depend for the material of their fleets. But some private yards were considerable and highly successful producers of warships for many years prior to the enactment of that measure. During the two hundred odd years of their continuous existence, for example, Scotts' of Greenock have been builders of a wide variety of war vessels, ranging in size from speedy destroyers up to battleships of the "Dreadnought" type. Laird's of Birkenhead, Palmer's of Jarrow, Armstrong Whitworth of Elswick and Walker, the Vickers yard at Barrow, the Brown yard at Clydebank, and the Fairfield Company all have highly creditable records in naval shipbuilding. Palmer's, Laird's, and Armstrongs were early constructors of armoured ships.

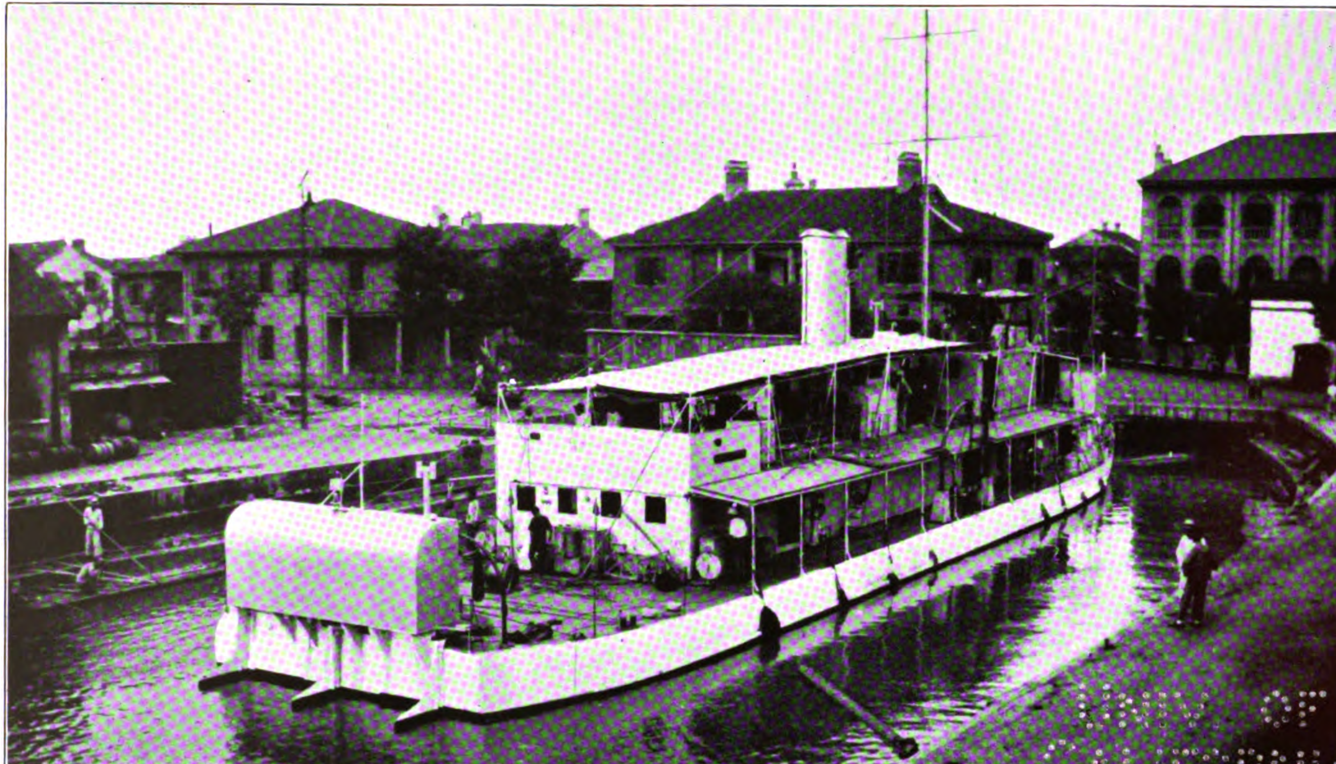
When the late Sir John Thornycroft was at Chiswick, and the late Sir Alfred Yarrow at Poplar, the Thames was a notable producer

of speedy surface torpedo craft. To-day, in their very efficient establishments at Southampton and Scotstoun, succeeding generations are, as their records show, successfully carrying on the good work.

Other firms which built warships belonging to the naval construction programmes of the early and later 'nineties were the London and Glasgow Company of Govan, Robert Napier & Sons of Govan, Robert Stephenson of Hebburn, Wm. Doxford & Sons of Sunderland, Earle's Company of Hull, and Hawthorn, Leslie & Co. of Hebburn. The London and Glasgow Company's yard as well as that occupied by Robert Napier are now part of Messrs. Harland and Wolff's Govan establishment. The Napier business was, however, prior to the acquisition of its site by the well-known Belfast firm, absorbed by Messrs. William Beardmore & Co., who eventually carried it on at Dalmuir, lower down the Clyde, in a newly laid-out and modernly equipped yard suitable for the construction of warships and merchant vessels of the largest size and power. The Dalmuir shipyard has since been dismantled under the British shipyard concentration scheme, but the engine works and repair works of Beardmore still continue there, and several sets of engines for important warships in recent programmes have been allotted to the establishment.

In the early 'nineties Admiralty contractors tendered for only hulls and engines—one or two, indeed, for hulls only. Armour was a speciality of firms like Vickers, Cammell, and John Brown of Sheffield, Armstrong Whitworth of Elswick and Manchester, and Beardmore of Glasgow. For guns and gun-mountings the Admiralty had to depend on Vickers, Armstrong Whitworth, and Beardmore. Armstrong Whitworth & Co. were armour and armament makers as well as shipbuilders, and the convenience of such an arrangement could not possibly escape the notice of other armour and armament manufacturers. The Vickers interest, therefore, in due course acquired a controlling interest in the Naval Construction Works at Barrow-in-Furness, the Cammell interests amalgamated with Laird Bros. of Birkenhead, and John Brown absorbed the Clydebank Shipbuilding and Engineering Company, Ltd. Messrs. Beardmore's acquisition of the Robert Napier business has been mentioned. Of these reconstituted groups, however, only Vickers Sons & Maxim—as Barrow now called itself—Armstrong Whitworth and William Beardmore were makers of guns. This led eventually to the formation of the Coventry Ordnance Works by John Brown, Cammell Laird and the Fairfield Company. Of five firms, therefore, could it then be said that they were capable of producing out of practically their own resources a complete warship of any size. For Armstrong Whitworth's ships, the propelling machinery was, in those days, constructed elsewhere. The fact that the complete warship could be built by a firm out of its own resources was, of course, a substantial advantage when foreign orders were in the market.

Yards have been enlarged and equipped with the most modern appliances in order to fulfil the requirements. Ideas which have appealed to the strategists in Whitehall have been developed by contractors to suit naval requirements. All this has cost money,



H.M. RIVER GUNBOAT SANDPIPER, 185 TONS.

Commissioned at Shanghai, August 30, 1933.

(By courtesy of the builders, J. I. Thornycroft & Co., Ltd.)

but the money has been willingly spent. Barrow's development of the submarine is a notable instance of this kind of co-operation, and the Weir development of engine-room auxiliaries is another. To the co-operation of contractors with the Engineer-in-Chief's department has been due the success of the water-tube boiler and the marine steam turbine. The possibilities of the internal-combustion engine for surface warships may be, for the moment, obscure, but if there are developments along this line we may be sure that dependence will be no less than it has been on the experience, skill, and goodwill of the contractors.

When naval orders are given out—even to the limited extent which has been a feature of recent post-War years—the effect is almost immediately appreciable on industrial activity in the principal areas of England, Scotland, and Wales. Steel is required for hulls and turbines and boilers—much of it of special qualities specified by the naval authorities. In days when battleships and battle-cruisers were built, heavy armour had to be provided. Armour, an important product of the English Steel Corporation, John Brown & Co., Ltd., and Wm. Beardmore & Co., is still required, though its thicknesses are necessarily not what they were in other days. Guns and gun mountings, which represent a large proportion of any ship's cost, have to be provided by the Vickers-Armstrongs establishments at Barrow-in-Furness and on Tyneside and also in one or two Government factories. The manufacture and preliminary preparation of the heavy material of a warship gives indeed employment to thousands of men over a wide area.

The beneficial effects on private industry by no means end there. The necessity of keeping down weight has called for metallurgical developments in which non-ferrous metals play a large part. Activity in the Midlands and Yorkshire—to name only two areas—is stimulated when products of this character are required. Metal fittings are, for example, largely used for warship interiors. Condenser tubes are another important item in this connection, although the development is on another account than that of lightness.

The provision of auxiliaries for both engine-room service and the work of the ship is another important subsidiary industry. Main turbines are by no means the only engines in a modern warship. Power is, on the contrary, generated for a great variety of auxiliary purposes and transmitted electrically, hydraulically, and pneumatically. The power of the electrical machinery required for large ships reaches high figures and its construction gives employment to many skilled workers. It is said, for example, that the electrical installation of one of the large American aircraft carriers is sufficient to light the city of Boston. Materials, guns, gun mountings, and auxiliaries provide employment for thousands of workers in a widespread area—apart altogether from that provided by the construction of hulls and engines.

Largely because many separate industries are concerned with the production of a warship it is not easy definitely to see what the naval construction capacity of the contract industry is. Still, the fact must never be lost sight of that the measure of its capacity is

the degree of success attained in co-ordinating the activities of its sections.

The ship construction section may, however, safely be assumed to be modernly equipped and splendidly efficient. Given a flow of the products of the ancillary and subsidiary industries its capacity expressed in economy and speed of production is probably unequalled elsewhere in the world. That may also be written down as true of the Royal dockyards. Moreover the contract industry possesses not only plants capable of building armoured ships of the largest type, but staffs and workmen who have acquired reliable experience in work of that character and class. There are, for example, eight private yards which could lay down as large a battleship as is contemplated by any naval authority to-day. Three of these are on the Clyde, two on the Tyne, two on the English west coast and one at Belfast. No fewer than six of them have actually constructed what are called super-Dreadnoughts. The Nelson was built in the establishment at Walker-on-Tyne which is now owned by Vickers-Armstrongs, Ltd., and the sister ship Rodney in the Birkenhead establishment of Cammell Laird & Co., Ltd. The Hood was built in one of the Clyde yards—that of John Brown & Co., Ltd., Clydebank. The Vickers-Armstrongs yard at Tyneside could lay down and complete in normal time two ships like the Nelson. With the record in naval construction of the Barrow works of the same enterprising concern, the world is tolerably familiar. Super Dreadnoughts have been built there; they have also been built at the works of Scotts' Shipbuilding and Engineering Co., Ltd., Greenock, and the works of the Fairfield Shipbuilding and Engineering Co., Ltd., Govan, Glasgow. No large armoured ship capable of taking its place in the line of battle has been built by Swan, Hunter and Wigham Richardson, Ltd., Wallsend-on-Tyne, or Harland and Wolff Ltd., Belfast, but obviously establishments which can construct, launch and fit out such ships as the Mauretania and Olympic are capable of carrying out contracts for the provision of vessels of that class. Great Britain's battleship fleet capacity is on this showing ample, although not many years ago the number of units was greater.

In any effort to express the cruiser-building capacity of the contract industry, we are faced with the difficult consideration that many yards which have hitherto—except of course during the War—confined themselves to the building of commercial ships are capable of carrying out work of this character. For our purpose—which is to emphasise not merely the capacity but the importance of the contract industry—it may, however, suffice to take into account only firms which have had experience of cruiser construction. Into this category come as a matter of course all the undertakings which have been mentioned as builders of large armoured vessels. To that list there should be added R. and W. Hawthorn, Leslie & Co., Ltd., Hebburn-on-Tyne, whose St. Peter's works higher up the river have a fine record as constructors of propelling machinery for high-speed war craft of more than one type.

An appreciable number of the firms which have earned distinction

in the construction of destroyers could of course be added to the list. There is, after all, not a great gap between, say, a flotilla leader like that built a year or two ago at Cowes for the Argentine and the smaller of the 6-in. gun cruisers now in course of construction. Our destroyer building resources are, as the War period disclosed, particularly good. Vessels of the class could be laid down in at least a score of private yards. Taking, however, only firms which now regularly tender for the construction of destroyers, twelve may be noted, reckoning the Vickers-Armstrongs yards at Barrow and Walker as separate plants. Included in the dozen are the yards which have been indicated as capable of producing large armoured ships and cruisers. In addition there are three undertakings with a worldwide reputation in the specialist branch of naval shipbuilding, namely, Yarrow & Co., Ltd., Scotstoun, Glasgow; John I. Thornycroft & Co., Ltd., Southampton; and J. Samuel White & Co., Ltd., Cowes, Isle of Wight. Messrs. Wm. Denny and Bros., Dumbarton, are also successful builders of destroyers.

The most notable British builders of submarines are, of course, Vickers-Armstrongs, Ltd., who have probably built a greater number of craft of the type than any other firm in the world, nor have their orders of this character been confined to undersea vessels for the British Navy. Some time ago a small flotilla was built for Chile, and at present another group is under construction for Portugal. Submarines for the Royal Navy are also at the moment being built by Cammell Laird & Co., Ltd., Birkenhead, and during the War, of course, a number of other firms did quite satisfactory work of this character.

Most of the firms, large and small, which have been mentioned are specialists in the construction of lightly armed vessels of moderate speeds—in other words, scouts. Two firms—John I. Thornycroft & Co., Ltd., and Yarrow & Co., Ltd.—are famous builders of shallow-draft gunboats, etc. Fleet auxiliaries have been built by most of the leading firms, while harbour service vessels—including powerful tugs—are regular products of undertakings which have so far not been mentioned.

All the shipbuilding establishments which have been named are capable of constructing the propelling machinery of the ships which they turn out, although actually they do not always do so. Some Tyne-built ships, for instance, have had their machinery constructed and installed by the Wallsend Slipway and Engineering Co., Ltd. Dockyard built ships of practically every type have their machinery built by contract, and for this work the whole range of the country's private engineering works compete, including the Wallsend Slipway and Engineering Co., Ltd., the Parsons Marine Steam Turbine Co., Ltd., and Wm. Beardmore & Co., Ltd., Dalmuir.

For armour, as has been noted, dependence is on John Brown & Co., Ltd., Sheffield, and the English Steel Corporation—which is, it will be recalled, a combination of the steel interests of Vickers, Armstrong Whitworth and Cammell Laird. The only private gun-making industry is now that of Vickers-Armstrongs, Ltd., who are also our only makers of gun-mountings. The contract industry's

facilities for the manufacture of armour and the construction of guns and gun-mountings are necessarily, it will be realised, nothing like what they were during the War. They are, however, at any rate so far as mechanical provision is concerned, much greater than they were prior to the outbreak of hostilities in 1914.

When the Coventry Ordnance Works were in full operation it was possible to say that Vickers, Ltd., Cammell Laird & Co., Ltd., John Brown & Co., Ltd., The Fairfield Shipbuilding and Engineering Co., Ltd., and Wm. Beardmore & Co., Ltd., could each build a complete armoured ship out of their own resources. But for the fact that the propelling machinery for the ships was built elsewhere, Armstrong Whitworth & Co., Ltd., would have been entitled to appear in that list. Through its association with the Sheffield-Birkenhead undertaking, Fairfield had access to armour making facilities, and the Coventry Ordnance Works were jointly owned by John Brown & Co., Ltd., Cammell Laird & Co., Ltd., and the Fairfield Shipbuilding and Engineering Co., Ltd. To-day, however, the only British private undertaking which can build a complete armoured ship out of its own resources is Vickers-Armstrongs, Ltd.—reckoning, that is, the English Steel Corporation as a Vickers concern.

Anyone who has followed the fortunes of the industry during the last decade knows that it has been the worst ten years in the modern history of the industry, both as regards the volume of naval work and of mercantile work. The private yards have, as a consequence, not had the necessary volume of work assured to them to secure the regular recruitment of labour which is so essential to the maintenance of a skilled personnel, whether artisans, labourers or technical staffs. In earlier times it very often happened that when Admiralty work was scarce, orders for merchant work were sufficiently numerous to enable warship builders to turn their men on to merchant work, and to enable them to continue to recruit essential labour—which would be required for warship work later—on large passenger ships for the construction of which the warship building firms were specially equippped. But the curtailment of warship building over the last ten years has unfortunately synchronised with a period during which there has been very little building or replacement of large passenger liners.

It has also to be borne in mind that warship building entails a much greater amount of employment proportionately than merchant work. It is generally agreed that at least 80 per cent. of the cost of a warship—Earl Beatty has put it as high as 90 per cent.—goes in wages, and in the New Year Supplement of Lloyd's List, Mr. J. B. Hutchison, ex-President of the Shipbuilding Employers' Federation, puts the difference between the two classes of work in an even more striking way : " If we take the cost of a cruiser of the Washington * class," he says, " as two and a quarter millions, including armament, this is equivalent, roughly, to 30 cargo vessels of 8,000 tons each, or, excluding armament, the hull and machinery is equivalent to 20 cargo boats ; and for the one warship there is a

* Displacement limited to 10,000 tons and guns to 8-in calibre, in accordance with the Washington Naval Treaty, 1922.

greater spread of benefit away from the shipyard areas for materials than would be the case with the cargo boats."

The Ministry of Labour Gazette has disclosed month after month during the past two years the existence of 100,000 workers following the industry for whom there is no employment. This high figure, however, should not be allowed to create the impression that skilled men will always be available in the future whenever a decision is taken to recommence Admiralty work on any scale required by national or Empire needs. If programmes of new naval construction are not formulated on a basis which gives a more regular run of employment in the various private yards, a state of affairs may quite well arise where, although the machinery and plant might be more than ample, the fulfilment of the demands for increased naval construction could only be achieved at the risk of serious delay and of disorganisation of the personnel in the yards which generally cater for the construction of merchant tonnage. You cannot make a trained shipyard worker in a few days, or even months. The usual period of apprenticeship is five years, and the ratio of apprentices to journeymen in employment is approximately one to three when conditions are normal. The number of apprentices trained in the British shipbuilding industry in the post-War period has only been about one-tenth of the number trained by the industry in the ten years before the War. This is a vital aspect of continuity of work to which attention has frequently been drawn by the heads of our warship building firms, such as Commander Craven, of Barrow; Sir Alexander Kennedy, of Fairfield; and Mr. W. L. Hichens, of Cammell Laird & Co., Ltd.

The British Navy is regarded by experts as very much over age. The working personnel of the shipyards is even more over age than the ships. The men who built the ships of the Navy that saw service in the War could be taken on an average age basis to be approximately thirty to forty years of age. That, however, is something like twenty-three years ago, and men who were then comparatively young are now well past the prime of their working life, having regard to the heavy manual work associated with naval shipbuilding.

Reliance on an expanding mercantile marine to provide a skilled personnel that could at any time be turned on to the production of warships gave satisfactory results in the twenty years before the War. That method is not now available because in recent years the British mercantile marine has not been expanding, but has been shrinking.

A further difficulty affecting the recruitment of an adequate labour personnel for several years has been the diversion from Great Britain of a large volume of warship orders previously secured from non-shipbuilding nations. To show the extent to which British shipyards benefited in the years before the war, it may be said that at the close of the years 1911, 1912, and 1913, there was in each case over 100,000 displacement tons of foreign warship work under construction in Britain, and at June 1914 there were 16 such ships building with a total tonnage of 152,145 tons, a considerably greater

total tonnage than the private yards have had under construction for the British Admiralty at any time since 1929.

The recent success of British shipyards in obtaining contracts from Portugal for the re-equipment of the Portuguese Navy gives rise to hopes that these orders may be the forerunners of a return to British shipyards of orders for other foreign navies. British built warships are to-day not only the cheapest, but they embody the latest and best advances in naval architecture, a fact which is being more than ever appreciated by foreign admiralties. It has been said that the United States is paying twice as much as our own Admiralty for the construction of the same kind of craft, while Japanese and French vessels are also very much dearer.

The country should never forget the extremely important part played by the British shipbuilding industry at the time of the War of 1914–18. Memories in these matters are notoriously short, but anyone who, like the writer, was closely identified with the private shipbuilding industry in the various and changing calls and demands upon it throughout the war period cannot but realise how near the borderline between achievement and failure we were at various stages of the wartime effort.

The outbreak of the War saw thousands of reservists and apprentices who were Territorials being taken into military service. The artisans remaining in the mercantile yards were immediately transferred voluntarily by their employers to staff the warship yards to get ready in the earliest possible time the fighting units then nearing completion. Work went on day and night and throughout the week-ends. The private warship yards and the private mercantile yards and repairing establishments were also largely denuded of men to supply the increased personnel at the Royal dockyards.

The next step, and it came well within the first twelve months of the War, was the retransfer of men who had gone to the warship building yards. They were needed in the yards which up to that stage had not been regarded as warship builders to overtake the demands of the Navy for twin screw and paddle minesweepers, and the host of small craft and barges required for shallow draft work and inland waterways.

As the War proceeded there were ever increasing demands by the Admiralty and later by the Shipping Controller, Lord Maclay, on the merchant shipbuilders for fast surface vessels for use in dealing with the submarine menace, for trawlers and drifters in connection with mine-field work, and for barges for Mesopotamia.

With the advent of unrestricted submarine warfare in 1916–17, practically the whole resources of the British shipbuilding industry were concentrated on the replacement of the cargo tonnage which was being sunk in hundreds of thousands of tons every month. As compared with the position earlier in the War, when the completion of fighting units had to take precedence, it was now a case of mercantile work having the prior claim if the very existence of the nation was not to be imperilled. Shipyard executives and administrators and shipyard artisans who had been allowed in the earlier

stages of the War to take up military service had to be returned to the shipyards. Men rejected for military service who had any mechanical qualifications were poured into the trade. To make the wartime effort the industry responded nobly by large extensions to premises, particularly when the demand for an increased mercantile tonnage arose in 1917 as a result of the submarine sinkings.

The British shipbuilding industry, because of the depression in commercial shipbuilding in the last ten years, because of the failure to provide it with regular warship replacement work, because of the nationalistic policy of other nations in preventing by means of subsidies their shipowners from building with British shipbuilders, and because of the wartime extensions, which, contrary to public belief, have been terrible liabilities and not assets, is to-day quite incapable of repeating its great effort of 1914 and following years. It has been shown what a tremendous asset contract warship building is to the nation and the Empire. If the nation wants this valuable asset preserved in the interests of national security, then the wisdom of embarking upon regular and systematic replacement of our out-of-date and over-age naval units and of the auxiliary fleet services is clear.

The British naval contract industry is, by the record of its wartime service and by the clear evidence of its present-day high efficiency, entitled to regard itself as one of the Empire's most valuable assets. The prosperity of many communities ebbs and flows with its activities; its products are essential when peace reigns and vital when the security of the Empire is menaced. Its tragic plight at the moment is, however, that the work entrusted to it—mercantile as well as naval—is far below its productive capacity. There is unmistakably real danger in the position as it stands. As Lord Weir said in a letter to *The Times* not long ago, " If you deprive a great and technically complex industry like shipbuilding of a reasonable bulk of contracts of varied character for some years, you will find you have wrecked an irreplaceable machine in the form of the technical staffs and skilled craftsmen."

" SENTINEL."

MERCHANT SHIPPING SECTION.

CHAPTER VIII.

STANDING OF THE WORLD'S MERCHANT FLEETS.

THE long-continued industrial depression, reacting on an unduly inflated mercantile marine, has at last had a well-defined repercussion, causing for the second year running a substantial decline in the total tonnage of the mercantile marine of the world. The process indeed has been carried farther than the official figures indicate, because the rate of breaking up ships progressed more rapidly as the year wore on and is not shown in the statistics.

Between June, 1931, and June, 1932, there was a net decrease of 396,730 tons. During the ensuing twelve months, the net decrease was 1,814,125 tons. In each case, all classes of tonnage suffered, although motorships continued to increase. Table I shows the changes which have occurred during the last three years in the merchant fleets of the world. In other years, both motorships and steamships have increased, but the decrease of sailing ship tonnage has now been going on for a long time.

TABLE I.—NET INCREASE OR DECREASE IN WORLD TONNAGE.

	1933.	1932.	1931.
	Gross Tons.	Gross Tons.	Gross Tons.
Sailing ships	− 73,508	− 42,070	− 175,601
Steamships	−1,902,632	−961,604	− 636,099
Motorships	+ 162,015	+606,944	+1,335,096
Net result	−1,814,125	−396,730	+ 523,396

TABLE II.—NET INCREASE OR DECREASE OF TONNAGE IN DIFFERENT COUNTRIES.

	1933.	1932.	1931.
	Gross Tons.	Gross Tons.	Gross Tons.
Great Britain and Ireland	−970,936	−631,230	−135,539
Germany	−263,568	− 89,759	+ 25,366
Italy	−240,765	+ 54,899	+ 4,447
Holland	−198,383	−154,330	+ 31,855
U.S.A.	−188,821	− 95,563	−403,625
Japan	+ 3,145	− 21,327	− 40,463
Soviet Russia	+158,068	+ 81,308	+ 71,740
Panama	+148,621	+ 7,141	+ 55,903
Finland	+ 88,407	+ 20,288	− 1,048
Norway	− 87,299	+101,333	+397,217
Greece	− 52,993	+ 72,282	+ 6,883

The principal changes which have taken place in different countries annually for the last three years are shown in Table II.

An interesting feature of the year was the increase of tonnage under the flags of Finland and Panama, 88,407 tons and 148,621 tons respectively. In neither case is it attributable to national requirements, and the obvious inference is that there are certain financial advantages to be gained by transference to these flags, a point which may be worth closer scrutiny as the years go on.

The United States tonnage has declined each year since the peak of 14,738,506 tons was reached in 1922, the latest available figure being down to 10,692,798 tons. The British figure reached its peak of 20,438,444 tons in 1930, and has fallen to 18,700,739 tons. All these figures and those in other tables are taken, except where stated otherwise, from the latest edition of Lloyd's Register, which brings the position up to the end of June in each year.

Table III.—Tonnage of the World.

Year.	Steam and Motor.		Sail.		Total.	
	No.	Tons.	No.	Tons.	No.	Tons.
1913	23,897	43,079,177	6,694	3,890,936	30,591	46,970,113
1914	24,444	45,403,877	6,392	3,685,675	30,836	49,089,552
1915	24,508	45,729,208	6,212	3,532,561	30,720	49,261,769
1916	24,132	45,247,724	6,035	3,435,412	30,167	48,683,136
1919	24,386	47,897,407	4,869	3,021,866	29,255	50,919,273
1920	26,513	53,904,688	5,082	3,409,377	31,595	57,314,065
1921	28,433	58,846,325	4,773	3,128,328	33,206	61,974,653
1922	29,255	61,342,952	4,680	3,027,834	33,935	64,370,786
1923	29,246	62,335,373	4,261	2,830,865	33,507	65,166,238
1924	29,024	61,514,140	3,932	2,509,427	32,956	64,023,567
1925	29,205	62,380,376	3,711	2,261,042	32,916	64,641,418
1926	29,092	62,671,937	3,523	2,112,433	32,615	64,784,370
1927	28,967	63,267,302	3,205	1,925,608	32,175	65,192,910
1928	29,387	65,159,413	3,021	1,795,246	32,405	66,954,659
1929	29,612	66,407,393	2,870	1,666,919	32,482	68,074,312
1930	29,996	68,023,804	2,717	1,583,840	32,713	69,607,644
1931	29,952	68,722,801	2,392	1,408,239	32,344	70,131,040
1932	29,932	68,368,141	2,315	1,366,169	32,247	69,734,310
1933	29,515	66,627.524	2,185	1,292,661	31,700	67,920,185

Owing to the War, statistics were not compiled regarding the vessels recorded in Lloyd's Register Books for the years 1917 and 1918. Tonnage figures for sailing vessels prior to 1919 are net tons; otherwise all tonnages are gross tons.

Tables III and IV show more fully the principal features summarised in Tables I and II. Since 1914 the sailing ship fleet has been reduced by 2,760,000 tons, and now represents less than 2 per cent. of the world's mercantile marine. The total sailing ship tonnage to-day is only 1,293,000 tons, and if from this figure there be excluded such barges as are generally towed, and other craft which are included because they are not self-propelled by machinery, the real sailing ships amount to only 571,000 tons, of which 33 per cent. are owned in the United States, 12 per cent. in Finland, and about 2½ per cent. in Great Britain and Ireland. There are only eleven sailing ships of between 3,000 and 4,000 gross tons in existence.

On account of the relatively small importance of sailing ships they may be disregarded and attention may be confined to steam and

TABLE IV.—TONNAGE OWNED BY PRINCIPAL MARITIME COUNTRIES.
(In thousands of tons, '000 omitted.)

	Great Britain and Ireland.	United States (Sea-going).	Japan.	Germany.	Italy.	France.
1914	19,257	2,970	1,708	5,459	1,668	2,319
..	..	..	..	..	..	..
1919	16,555	10,782	2,325	3,503	1,370	2,234
1920	18,330	13,790	2,996	673	2,242	3,245
1921	19,571	14,697	3,355	717	2,651	3,652
1922	19,296	14,738	3,587	1,887	2,866	3,846
1923	19,281	14,597	3,604	2,590	3,034	3,737
1924	19,106	13,530	3,843	2,954	2,832	3,498
1925	19,441	12,949	3,920	3,074	3,029	3,512
1926	19,400	12,365	3,968	3,111	3,241	3,490
1927	19,309	12,070	4,033	3,363	3,483	3,470
1928	19,875	11,997	4,140	3,777	3,429	3,344
1929	20,166	11,835	4,187	4,093	3,285	3,379
1930	20,438	11,388	4,317	4,229	3,331	3,531
1931	20,303	10,999	4,276	4,255	3,336	3,566
1932	19,672	10,889	4,255	4,165	3,391	3,557
1933	18,701	10,693	4,258	3,901	3,150	3,513

	Norway.	Holland.	Sweden.	Spain.	Denmark.	Total all Nations.
1914	2,505	1,496	1,118	899	820	49,089
..	..	..	..	..	..	..
1919	1,858	1,592	993	751	702	50,919
1920	2,219	1,793	1,073	997	803	57,314
1921	2,584	2,226	1,160	1,165	964	61,975
1922	2,601	2,633	1,115	1,283	1,038	64,371
1923	2,552	2,626	1,208	1,260	997	65,166
1924	2,505	2,556	1,254	1,240	1,036	64,024
1925	2,680	2,601	1,301	1,185	1,060	64,641
1926	2,842	2,565	1,338	1,163	1,081	64,784
1927	2,824	2,654	1,365	1,162	1,060	65,193
1928	2,968	2,817	1,447	1,164	1,068	66,955
1929	3,324	2,939	1,510	1,162	1,056	68,074
1930	3,668	3,086	1,624	1,232	1,088	69,608
1931	4,066	3,118	1,705	1,227	1,145	70,131
1932	4,167	2,964	1,716	1,265	1,181	69,734
1933	4,080	2,765	1,675	1,232	1,168	67,920

motor propelled vessels. The principal changes which have taken place in these are given in Table V, which shows that, during the years June, 1914, to June, 1923, the net increase was 16,931,000 tons, making the total 37 per cent. greater than in 1914. The net addition since 1923 amounts to 4,293,000 tons, or less than 7 per cent. of the tonnage at 1923. Between 1914 and 1923 the largest increases were :—U.S.A., 11,336,000 tons ; Japan, 1,896,000 tons ; France, 1,531,000 tons ; Italy, 1,451,000 tons ; and Holland, 1,135,000 tons. The principal increases since 1923 have been :—Norway, 1,702,000 tons ; Germany, 1,378,000 tons ; Greece, 670,000 tons ; Japan, 654,000 tons ; and Sweden, 522,000 tons. The increase in Norwegian tonnage consists largely of oil tankers. Germany has never recovered her pre-War total and is still 1,247,000 tons below it, while the British total is down by 300,000 tons. Changes which have

TABLE V.—COMPARISON OF STEAM AND MOTOR TONNAGE AT JUNE, 1914; JUNE, 1923; AND JUNE, 1933.

Countries.	1914.	1923.	1933.	Difference between	
				1923 and 1914.	1933 and 1923.
	Gross Tons.	Gross Tons.	Gross Tons.	Gross Tons.	Gross Tons.
Great Britain and Ireland	18,892,000	19,115,000	18,592,000	+ 223,000	− 523,000
British Dominions	1,632,000	2,580,000	2,983,000	+ 948,000	+ 403,000
Denmark	770,000	938,000	1,160,000	+ 168,000	+ 222,000
France	1,922,000	3,453,000	3,470,000	+ 1,531,000	+ 17,000
Germany	5,135,000	2,510,000	3,888,000	− 2,625,000	+1,378,000
Greece	821,000	747,000	1,417,000	− 74,000	+ 670,000
Holland	1,472,000	2,607,000	2,759,000	+ 1,135,000	+ 152,000
Italy	1,430,000	2,881,000	3,093,000	+ 1,451,000	+ 212,000
Japan	1,708,000	3,604,000	4,258,000	+ 1,896,000	+ 654,000
Norway	1,957,000	2,376,000	4,078,000	+ 419,000	+1,702,000
Spain	884,000	1,199,000	1,218,000	+ 315,000	+ 19,000
Sweden	1,015,000	1,136,000	1,658,000	+ 121,000	+ 522,000
United States (Sea)	2,027,000	13,426,000	10,088,000	+11,399,000	−3,338,000
,, (Lakes)	2,260,000	2,197,000	2,474,000	− 63,000	+ 277,000
Other Countries	3,479,000	3,566,000	5,492,000	+ 87,000	+1,926,000
Totals	45,404,000	62,335,000	66,628,000	+16,931,000	+4,293,000

taken place at various periods between 1896 and 1933 are shown as percentage figures in Table VI.

TABLE VI.—PERCENTAGE OF TONNAGE OWNED TO-DAY COMPARED WITH 1914 AND 1896.

	1896. per cent.	1901. per cent.	1914. per cent.	1926 per cent.	1932. per cent.	1933. per cent.
Great Britain and Ireland	56·0	50·2	41·6	30·7	28·6	27·9
United States (Sea)	4·0	4·2	4·5	18·1	15·0	15·1
Japan	1·9	2·2	3·8	6·3	6·2	6·4
Norway	3·0	3·4	4·3	4·5	6·1	6·1
Germany	8·1	10·1	11·3	4·9	6·1	5·8
France	5·2	4·4	4·2	5·3	5·1	5·2
Italy	2·0	2·7	3·1	5·0	4·9	4·6
Holland	1·8	2·1	3·2	4·1	4·3	4·1

Of the world total 3,023 vessels of 8,693,437 tons, or 13 per cent. of the steam and motor tonnage, are less than five years old. There are 9,108 ships of 11,986,636 tons over 25 years old, or 18 per cent. of the grand total. The average size of these very old ships is 1,316 tons and of the new ones 2,876 tons. Nearly 15 per cent. of the tonnage owned in Great Britain and Ireland is less than five years old. This compares with the following percentages for other countries :—Norway 28, Holland 20, Denmark 18, France 17, Japan 12, Italy 10, U.S.A. (Seagoing) 6, and Greece 1·2. Vessels of 15,000 tons and more account for only 5·49 per cent. of the total tonnage, and of this nearly 50 per cent. is owned in Great Britain and Ireland.

As a matter of interest in connection with the age of ships, Table VII has been compiled from a more elaborate one in Lloyd's Register. This simplified analysis shows the tonnage under ten years old, that between ten and twenty years old, and that older than twenty years. It covers, approximately, the years 1923–1933, 1913–1923, and 1913 and older—roughly, the pre-War, the War and

immediate post-War period, and the later period. It throws an interesting light on the changes which have taken place in the shipping history of our time.

TABLE VII.—AGE OF VESSELS OF PRINCIPAL COUNTRIES.

	Under 10 years.		10–20 years		20 years and over.	
	No.	Tons.	No.	Tons.	No.	Tons.
Great Britain and Ireland	2,086	7,264,446	2,598	7,786,298	2,644	3,505,460
U.S.A. (Sea)	242	996,369	1,688	7,758,973	720	1,333,096
Denmark	180	419,733	280	448,413	245	292,087
France	255	914,796	621	1,619,092	635	935,650
Germany	485	1,317,260	802	1,737,232	784	833,495
Greece	10	41,155	97	331,135	430	1,144,781
Holland	487	1,053,129	523	1,328,324	382	377,359
Italy	195	859,553	323	1,138,936	534	1,094,283
Japan	431	881,802	963	2,141,802	625	1,243,555
Norway	532	1,896,324	668	1,350,470	765	831,229
Spain	135	266,107	287	479,336	378	472,525
Sweden	147	469,706	354	493,509	838	694,933
Total for the World	6,482	18,956,227	10,643	29,047,893	12,390	18,623,404

The tables in the statistical appendix to Lloyd's Register supply a means of estimating the tonnage available for general cargo and passenger purposes. The tonnage of the 1,442 oil tankers, of 1,000 tons gross and upwards, amounts to 8,756,832 tons ; 380 of 2,269,088 tons are registered in Great Britain and Ireland, 389 of 2,501,738 tons in the United States, and 214 of 1,508,033 tons in Norway. In addition, there are 106,180 tons of tankers of less than 1,000 tons each. The tonnage of trawlers and other fishing vessels and whalers amounts to 1,032,785 tons. An analysis of the vessels recorded in the Register Book shows that 396,537 tons represent tugs and salvage vessels ; ferries amount to 326,400 tons ; cable vessels to 78,684 tons ; while river vessels and vessels owned by Municipal Corporations or Harbour Authorities, and steam barges, dredgers and similar craft amount to 527,774 tons. It will thus be seen that, without taking into account size, age, or material, there are about 11,225,000 tons of vessels which are not used for ordinary cargo and passenger purposes.

If all vessels of the types mentioned in the preceding paragraph be omitted, and disregarding also (*a*) vessels trading on the Great Lakes of North America ; (*b*) wooden and composite vessels ; (*c*) vessels of less than 4,000 tons gross, and (*d*) vessels over 25 years old (with the exception of a few which, although up to 30 years old, are still capable of a high speed) and presumably of less efficiency than more modern vessels, we get the figures given in Table VIII. This shows that there are 31,549,124 tons of the larger ocean-going ships, and the British proportion rises from 27·9 per cent. of general

tonnage to 37·7 per cent. of the larger ships. The changes for other countries are also shown in the table. Holland, Italy, and Germany go up, but Norway drops materially because of the large proportion of tanker tonnage which, as has been explained, is not included. Figures of ocean-going tonnage for the previous three years are:— 1932, 32,435,177 tons; 1931, 26,963,000 tons; and 1930, 27,136,195 tons.

TABLE VIII.—OCEAN-GOING TONNAGE.

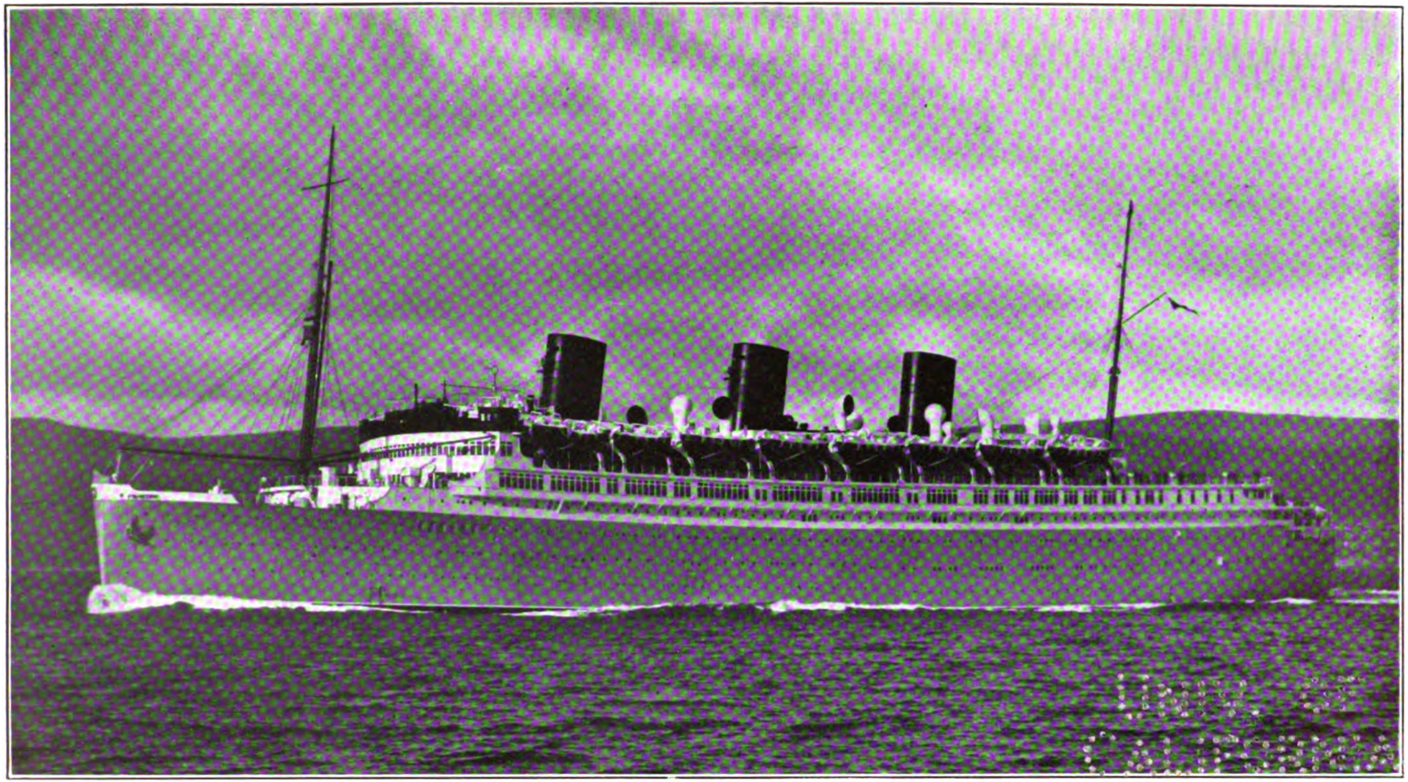
Countries.	Total Steam and Motor Tonnage.		Ocean-going Tonnage.	
	Tonnage Owned.	Percentage of World Total.	Tonnage Owned.	Percentage of World Total.
Great Britain and Ireland	18,592,204	27·90	11,899,567	37·72
United States	12,660,278	19·00	5,626,777	17·83
Germany	3,887,987	5·84	2,232,154	7·08
Japan	4,258,159	6·39	2,079,448	6·59
France	3.469,538	5·21	1,908,862	6·05
Italy	3,092,772	4·64	1,800,939	5·71
Holland	2,758,812	4·14	1,641,750	5·20
Norway	4,078,133	6·12	997,250	3·16
Other Countries	13,829,641	20·76	3,362,377	10·66
World Totals	66,627,524	100·00	31,549,124	100·00

Another computation based on a different principle, which has been a feature of "Brassey" for many years, is shown in Table IX. This is not confined to the larger ocean-going type, and the basis on which the figures have been compiled is indicated in the table.

TABLE IX.—TONNAGE AVAILABLE FOR CARRYING GOODS AND PASSENGERS.

	Gross Tons.	Gross Tons.
Total Tonnage of the World	—	67,920,185
Sailing Ships	1,292,661	
Oil Tankers, 1,000 tons and over	8,756,832	
Oil Tankers, under 1,000 tons	106,180	
Trawlers and other Fishing Vessels	1,032,785	
Tugs and Salvage Vessels	396,537	
Ferries, dredgers, cable-ships, river-craft, etc.	932,858	
Lake vessels, U.S.A.	2,474,166	
Lake vessels, Canada	435,769	
		15,427,788
Steam and Motor Tonnage available for goods and passengers		52,492,397
Comparative figure for 1932		53,815,821
" " " 1931		54,597,403
" " " 1930		55,067,368
" " " 1929		54,080,656
" " " 1928		53,332,592
" " " 1927		52,182,481

The great oil-tanker "offensive," which provided so much employment in the shipyards from the beginning of 1930, slowly petered out towards the end of the year. By the middle of 1930 there were 1,110,000 tons of oil tankers under construction, by far the highest figure on record and a sharp reminder of the importance of this



THE FURNESS, WITHY TURBO-ELECTRIC LINER QUEEN OF BERMUDA.

(Builders, Messrs. Vickers-Armstrongs, Barrow-in-Furness.)

modern, specialised form of transportation as a factor in the economics of shipping and of its value to the shipbuilding industry. This point has been emphasised in previous years, and the development over a period of years is shown in Tables X and XI. Like the general tonnage, the tanker fleet shrank during the year, and possibly the total will be further reduced a year hence. The normal life of a tanker is much less than the allotted span of 20 years, or more, accorded to general cargo ships.

TABLE X.—PERCENTAGE OF TANKERS TO TOTAL WORLD TONNAGE (SAIL EXCLUDED).

	Total World Tonnage (Sail excluded).	Tankers.	Percentage Tankers.
	Gross Tons.	Gross Tons.	
1914	45,404,000	1,479,000	3
1919	47,897,000	2,929,000	6
1920	53,905,000	3,354,000	6
1921	58,846,000	4,419,000	8
1926	62,672,000	5,665,000	9
1928	65,159,000	6,620,000	10
1929	66,407,000	7,071,000	11
1930	68,024,000	7,628,000	11
1931	68,723,000	8,650,000	13
1932	68,368,000	8,911,000	13
1933	66,627,000	8,756,832	13

TABLE XI.—PROPORTION OF SHIPBUILDING CONSTRUCTION ABSORBED BY OIL TANKERS.

	Oil Tankers.	Total Shipbuilding.	Percentage Tankers.
Jan. 1, 1922	793,193	4,457,393	18
„ 1923	300,128	2,954,318	10
„ 1924	175,164	2,444,336	7
„ 1925	309,270	2,470,436	12
„ 1926	308,439	2,069,545	15
„ 1927	371,520	1,933,027	19
„ 1928	744,668	3,118,721	24
„ 1929	361,972	2,618,001	14
„ 1930	627,756	3,110,880	20
„ 1931	907,298	2,326,086	39
„ 1932	351,320	1,403,795	25
„ 1933	194,490	765,720	25
Oct. 1933	149,064	756,752	20

Table XI shows that tanker construction accounted for 20 per cent. of the total shipbuilding in October of last year. It is necessary to go back at least ten years to find anything approaching the present small figure, and the fact that tankers are still absorbing something like 20 per cent. of shipyard production is a reflex of the paucity of shipbuilding going on to-day. In 1924, when there were 175,000 tons building, tankers accounted for only 7 per cent. of the total shipyard production.

These tanker figures lend colour to the suggestion that a revival of oil tanker building is overdue, and in fact some orders were

announced towards the end of the year. In the meantime, the tanker interests have taken steps to rationalise the available ships, and it is to be hoped that the next stage of expansion will be devoid of the deplorably uncontrolled accretion of new tonnage witnessed during the last three years.

It has already been stated that only motorship tonnage shows an increase on the registers of the world. This is understandable for two reasons. One is that, on the Continent particularly, the bulk of new ships are Diesel-engined. The other is that the reduction of the mercantile marine has been brought about by scrapping obsolete ships, and the really rapid growth of motorship tonnage goes back only about ten years. The development is shown in Table XII.

TABLE XII.—NUMBER AND GROSS TONNAGE OF MOTORSHIPS.

Lloyd's Register Book.	Motorships (including Auxiliary Vessels).	
	No.	Gross Tons.
July, 1914	297	234,287
,, 1919	912	752,606
,, 1920	1,178	955,810
,, 1921	1,472	1,248,800
,, 1922	1,620	1,542,160
,, 1923	1,795	1,666,385
,, 1924	1,950	1,975,798
,, 1925	2,145	2,714,073
,, 1926	2,343	3,493,284
,, 1927	2,552	4,270,824
,, 1928	2,933	5,432,302
,, 1929	3,246	6,628,102
,, 1930	3,696	8,096,337
,, 1931	4,080	9,431,433
,, 1932	4,420	10,038,377
,, 1933	4,663	10,200,392

A considerable series of changes are, however, taking place in the type of propelling machinery in existing ships. In some instances, notably certain Dutch liners, steam engines have been taken out and Diesel engines installed in their stead. In a few other cases, but most notably with the Asturias and Alcantara, the Diesel engines are giving place to high-pressure steam. More indicative of the changes, however, is the reduction in the number of purely steam reciprocating engined ships, partly through the introduction of exhaust steam auxiliary devices such as the Bauer-Wach and the turbo-electric system of the Metropolitan-Vickers Electrical Company. It is not unusual to classify these converted vessels as turbine-driven, with the result that turbine-engined ships rise to 11,022,000 tons, compared with 730,000 tons in 1914. The motorships have increased during the same period from 220,000 tons to 10,200,000 tons. The decrease of steam reciprocating engined tonnage in the year was no less than 1,924,000 tons, and it was 1,326,000 tons in 1932, 858,000 tons in 1931, 220,000 tons in 1930, and 311,000 tons in 1929. Certainly, the straightforward steam reciprocating engine has been giving way to the heavy-oil engine, the geared turbine, and the combination system.

So far as this last point is concerned figures for individual countries are not available, but an annotation to the appropriate table in Lloyd's Register statistics enables Table XIII to be compiled. The figures show the relatively slow advance of this combination system during the last year or two. There are, of course, included in these combination figures ships with the well-known triple-screw system, as adopted in the Olympic, of having two reciprocating engines driving the two wing propellers and exhausting into a turbine driving the central screw. Indeed, this may be said to be the forerunner of the later systems.

Table XIII.—Proportions of Combination System.

Year.	Reciprocating Engines.		Combination System included.	
	No.	Tons.	No.	Tons.
1933	23,485	47,177,395	234	1,801,739
1932	24,138	49,068,098	228	1,770,111
1931	24,489	50,194,250	199	1,570,124
1930	24,878	50,748,180	150	1,265,929
1929	24,892	50,540,617	93	839,082
1928	24,922	50,010,702	58	662,951

Figures for ships with turbo-electric and Diesel-electric drive are given in Table XIV. There were 91 electrically propelled vessels owned in 1933, no fewer than 63 of 301,000 tons being under the United States flag. Of those of more than 17,000 gross tons, 5 are owned in the United States and 5 in Great Britain. The American ships are the California, Pennsylvania, and Virginia, of the Panama Pacific Line, and the President Coolidge and President Hoover, of the Dollar Line. The British turbo-electric ships are the P. and O. liners, Viceroy of India, Strathnaver, and Strathaird, and the Furness Withy Bermuda liners, Monarch of Bermuda and Queen of Bermuda. The largest of all the turbo-electric liners, the Normandie, the biggest ship in the world, is still completing at St. Nazaire for the French Line.

Table XIV.—Electric Drive.

Year.	Turbo-electric.		Diesel-electric.	
	No.	Tons.	No.	Tons.
1933	43	448,434	48	117,184
1932	42	388,962	48	116,684
1931	38	342,400	46	114,690
1930	30	218,688	37	89,593

As already mentioned, and as shown in Table XII, the motorship continues its progress, still erratically as far as this country is concerned, but with very definite strides in Holland, Denmark, Norway, and Sweden. The American figures continue to show up unfavour-

ably, largely because the bulk of the American merchant fleet was built between ten and fifteen years ago, and consists of steamships constructed in hastily improvised yards. France also has a small proportion, although some very large Diesel-engined passenger ships have been built in recent years for French owners. The proportions of motorships to total tonnage in Great Britain and Ireland is 14 per cent., in Norway 43 per cent., in Denmark 39 per cent., in Sweden 33 per cent., in U.S.A. 5·5 per cent., and in France 6·6 per cent. It should be remembered, moreover, that, notwithstanding the rapid advance of the motorship, the motorship tonnage represents, to-day, no more than about 15 per cent. of the total, and it has been enhanced in recent years by the large number of oil tankers built, most of them having Diesel engines. Percentage figures alone, however, may be misleading, for, in spite of the relative proportions indicated by these figures, the motor tonnage owned by Great Britain and Ireland, totalling 2,615,117 tons, is by far the largest amount owned by any single country. Norway with its 43 per cent. owns 1,754,176 tons (1,508,033 tons being oil tankers) and Denmark's 39 per cent. represents 461,249 tons. Reference to Table XV, showing the proportion of oil tankers in the Norwegian mercantile marine, will also explain why, on these grounds, the Norwegian percentage of motorships is so high.

TABLE XV.—PROPORTION OF TANKERS IN THE NORWEGIAN MERCANTILE MARINE.

	Tankers.		Total Norwegian Fleet.		Percentage Tanker Tonnage.
Year.	No.	Gross Tons.	No.	Gross Tons.	
1933	214	1,508,033	1,970	4,079,540	37
1932	217	1,539,384	2,008	4,166,839	37
1931	204	1,450,470	1,990	4,065,506	36
1930	154	1,059,550	1,916	3,668,289	29
1929	117	781,575	1,807	3,224,493	24
1928	88	564,210	1,787	2,968,207	19
1927	63	403,812	1,805	2,824,225	14
1926	54	343,582	1,844	2,841,905	12

Concurrently with the development of the motorship the tonnage of vessels consuming oil continues to increase at the expense of purely coal burners. There are 3,895 steamers fitted for burning oil fuel, and there are 4,663 motorships of 10,200,392 tons. Not all the ships fitted for burning oil fuel do so; the installation is often interchangeable with coal-burning equipment. But, accepting these two figures at their face value, the result is to reduce the purely coal burning tonnage from 89 per cent. in 1914 to 54 per cent. in 1933. Various other comparative figures in this connection are given in Table XVI. The tonnage which in 1914 consumed coal was 43,860,000. It has now fallen by nearly 17½ million tons, and for a large part of the loss of bunker coal which this represents the coal mining troubles which culminated in the general strike of 1926 are responsible.

TABLE XVI.—PERCENTAGE OF TONNAGE FITTED FOR EMPLOYING OIL OR COAL AND PERCENTAGE OF SAILING SHIPS TO THE GRAND TOTAL.

	Percentage of Total Gross Tonnage.						
	1914.	1922.	1929.	1930.	1931.	1932.	1933.
Sailing vessels and sea-going barges	8·06	4·70	2·45	2·27	2·01	1·96	1·90
Oil, etc., in internal combustion engines	0·45	2·35	9·73	11·63	13·45	14·40	15·02
Oil fuel for boilers	2·65	22·34	28·53	28·53	28·52	28·87	29·52
Coal	88·84	70·61	59·29	57·57	56·02	54·77	53·56
	100·00	100·00	100·00	100·00	100·00	100·00	100·00

The great change during 1933 was in the tonnage sold for breaking up. Comparative figures are given in Tables XVII and XVIII. Hardly any cargo ships of consequence were built during 1933, the output consisting of a few passenger ships, a few oil tankers, and vessels for special services. The tonnage removed from the registers included a considerable proportion of general cargo ships and a number of obsolete liners. As the years go on it becomes apparent

TABLE XVII.—STEAMERS AND MOTORSHIPS BROKEN UP.

	No.	Tons.
1921	34	77,545
1922	160	315,110
1923	385	962,506
1924	485	1,174,258
1925	273	653,046
1926	358	798,633
1927	189	402,698
1928	296	735,547
1929	352	943,609
1930	311	848,538
1931	324	1,018,174
1932	365	1,346,140

that the sea takes toll of fewer ships. Repairers complain, to-day, that the reason why they have fewer collision damages to make good is that wireless and modern safety devices have reduced the marine risks, and also that, with so many ships laid up and so much less traffic in narrow sea and river channels, the chances of collision are much reduced. The proportion of loss by sea casualty is only about half what it used to be. Thus, the average yearly percentage of steam and motor tonnage lost during the years 1928–1932 amounted to only 0·64 per cent., whereas for the five years 1909–1913 it was 1·17 per cent. Hence there is less wastage from this cause. The carrying capacity of the world's merchant fleet has also increased automatically during the last year or so through the introduction of the new load-line rules with reduced freeboard, and, as vessels are now speedier than they were, fewer ships are needed to do the world's carrying. Cargo ships of 9 or 10 knots were usual before the War. To-day, some are being built which are capable of speeds up to 18 knots—the speed of mail boats on certain routes. Consequently, when figures are produced showing reductions in the mercantile

marine by breaking up it should be borne in mind that frequently only the old, slow, and obsolete ships are passing out, and that, ton for ton, they are not equivalent to the new ones coming in.

TABLE XVIII.—TONNAGE LOST AND BROKEN UP.

Year.	Steamers and Motorships.		Sailing Ships.	
	No.	Tons (gross).	No.	Tons (net).
1916	1,288	2,724,041	511	284,224
1917	2,605	6,607,261	748	520,206
1918	1,294	3,332,791	325	159,919
1919	425	524,172	241	112,658 (gross)
1920	370	518,595	215	138,959
1921	344	536,537	215	137,720
1922	511	743,866	205	143,946
1923	709	1,456,870	259	259,909
1924	777	1,614,662	239	243,017
1925	553	980,794	186	161,241
1926	656	1,226,873	182	117,070
1927	469	852,398	154	139,671
1928	584	1,220,176	121	94,471
1929	672	1,458,665	120	84,937
1930	561	1,232,521	107	80,763
1931	558	1,335,708	64	33,112
1932	573	1,696,245	78	55,112

WAR LOSSES INCLUDED IN THE ABOVE TABLE.

Year.	Steamers and Motorships.		Sailing Ships.	
	No.	Tons (gross).	No.	Tons (net).
1916	942	2,189,079	245	139,609
1917	2,211	5,957,913	523	392,449
1918	911	2,674,428	141	69,744

Moreover, the rate of breaking up to-day is no criterion of its continuance in like proportion. There never has been any uniformity in the annual rate of scrapping. The variations are exceptionally wide. In some comments on the figures for the past year Lloyd's Register has drawn special attention to this fact. For example, it was pointed out that, during the period 1905–1914, the minimum was 87,737 tons, and the maximum 251,900 tons. During the years 1915–1920 practically no tonnage was broken up, the yearly average amounting to only 10,000 tons. Quite different conditions are shown for recent years. During 1921 the tonnage broken up amounted to 77,500 tons ; it increased to 315,000 tons in 1922, and to 963,000 tons in 1923, and since the latter year it has kept at a high level, with the exception of 1927. The figures for 1932 are the highest on record, viz., 1,346,140 tons, although the million mark had been exceeded twice previously, in 1924 and 1931, when 1,174,258 tons and 1,018,174 tons, respectively were broken up. Since June

1932 over 3,300,000 tons have either been sold for breaking up or lost through casualty.

The aggregate steam and motor tonnage broken up during the ten years 1923–32—8,883,000 tons—represents a yearly average of 1·4 per cent. of the tonnage owned. Adding to these figures the tonnage of steamers and motorships lost through casualties during the same period—4,189,000 tons—it will be seen that the average wastage of sea-going merchant tonnage (excluding sailing vessels) only slightly exceeds 2 per cent. per year of the tonnage owned.

The total figures broken up during the ten years include 2,379,000 tons registered in Great Britain and Ireland; 2,581,000 tons in the United States (excluding Lake vessels); 1,208,000 tons in Italy; and 780,000 tons in France. The smaller proportion of British tonnage broken up is probably due to the fact that a large number of old British ships are sold to other countries, and this also explains why the proportion of comparatively new ships (i.e. under 20 years old) on the British register is so high. The United States, whose large accumulation of tonnage between, say, 1918 and 1923, has already been mentioned, has, at times, had to deal heroically with some of the ships. One hundred and twenty-four were scrapped fairly recently, and it is suggested that more than a hundred more, built about those years, will have to go. The American merchant fleet has been reduced from 14,738,000 tons to 11,000,000 tons in eleven years. There are still 5,707,000 tons of ships which were built about the same time, and most of them will have to go before long.

The case of America in regard to these 10–15-year-old ships is not, however, isolated. It has been urged in this chapter in previous years that nearly all such ships ought to be recorded as ranking with the 20-year-old ships. They were built during times of exceptional stress; materials were not always of a particularly high standard, and the workmanship in a large number of cases was of a low grade. There are 30,000,000 tons of shipping which, with certain exceptions, should be brought into this category. That represents 45 per cent. of the total mercantile marine. It is unlikely that such trading conditions will rule as to make it imperative to "scrap the lot," but much of it will have to go sooner than many people anticipate, and, indeed, sooner than its owners are likely to wish. Some of it, indeed, is only being kept afloat to-day because of financial reasons, because banks and other mortgagees are reluctant to wipe the ships off their books as bad debts. Economically, there is no justification for their continued existence. A further shrinkage of the world's tonnage by a vigorous scrapping policy is indicated for 1934. According to the Annual Report of Lloyd's Register, it is estimated that by Jnne, 1934, the world's available tonnage will have dropped to the 1927 level of approximately 65,000,000 tons, as compared with over 70,000,000 tons in 1931. The shipping industry will be the healthier for the reduction.

JOHN P. TAYLOR.

CHAPTER IX.

British Shipping after the International Conferences.

An article in last year's issue of " Brassey " showed how shipping policy had been reconsidered by British owners, both individually and collectively, through a Policy Committee of the Chamber of Shipping. During 1933, policy was again prominently in the minds of owners—not from choice, but from force of circumstances. Very great changes in shipping have taken place in recent years, and responsibility for these, or for many of them, is attributable to the War. Some industries may gradually be returning to the kind of conditions which obtained before the great upheaval, but British shipping is faced with a set of circumstances very different from those which previously existed and in which the industry was built up successfully.

No longer can managers of ordinary cargo vessels, commonly known as " tramps," calculate on securing outward freights of coal for their ships to all parts of the world, which would place them in a position to load homewards cargoes of commodities in bulk, largely foodstuffs. Members of an older generation of British owners are credited with having been particularly skilful in arranging charters, so that their ships were available to load in particular ports oversea just when the demand was coming to its maximum. They dispatched vessels on cross-voyages with the same purpose of making the best use of the opportunities provided by the different seasons. These owners now find themselves faced with entirely different and very difficult circumstances. The development of the use of oil in industry ashore and for shipping has reduced the demand for coal abroad, and so for shipping to carry it. For the fewer cargoes offering merchants are able to secure the benefit of the results of a greatly excessive supply of tonnage. Rates of freight have fallen to low levels—the lowest recorded since 1920—and it is often a choice for owners whether it is less expensive to send ships on long voyages in ballast to load cargo homewards or to carry cargoes of coal outwards at very poor rates, which, after meeting loading and discharging and other port expenses, must, in many cases, leave a balance on the wrong side.

This keen competition has been encouraged by the development of foreign mercantile shipping. Whereas the British mercantile marine is now substantially smaller than it was in 1914, other shipping fleets have much increased in size. The effect of this competition is far greater than would appear from the mere figures of tonnage owned in 1914 and at the present time, since with the

total tonnage greatly exceeding the demand, the pace is set by the ships with low working costs. When it becomes a question of ability to accept freights for which there is keen competition, in consequence of the surplus tonnage, those who can show a profit at the lowest rates are necessarily in a strong position to secure employment, and in recent years it has been not simply a question of the minimum rate at which a profit can be realised, but also of the rate which will show a loss only rather less than the cost of keeping vessels laid up idle in port. The working expenses of British shipping are largely subject to the strict regulations of the Board of Trade. It has to comply with provisioning scales and other requirements which foreign owners can often escape, and always can if they do not visit British ports. Thus the competition of foreign owners with lower working costs is much keener than it was.

Intensified Foreign Competition.

Even within the last year or two there have been indications of several kinds of an intensification of this keen competition. In the past British owners have been accustomed to dispose of ships which could no longer be ranked as modern. These vessels were largely bought by Mediterranean owners and found employment in that sea and in the Black Sea. Then the activities of these owners extended to Argentina where they became important, and lately the competition has appeared on other routes, notably the Indian and Far Eastern. This extension of operations has been made practicable by the purchase of newer and better types of second-hand ships. The severely depressed state of shipping has forced the prices for second-hand tonnage down to extremely low levels, and after holding on for years, in the expectation that an improvement could not be far off, and then being disappointed time and again, owners have found themselves obliged to sell their vessels—sometimes, it is known, under pressure from those who had advanced funds.

Subsidies have changed the conditions for both cargo vessels and liners. The older generation of shipowners had not to meet competition of this type, which has become serious of late. When foreign owners are receiving substantial financial support from their Governments they are able to enter a market and accept rates which would entail heavy loss on owners who receive no such assistance. The injury done to all shipping extends beyond the loss of particular employment to ownerships which have to rely entirely on their own efforts and resources. That loss is galling enough, especially to the owner who happens to know that he could have secured the employment but for the under-cutting of the rate by the subsidised owner. The harm extends farther. The acceptance of a very low rate exerts a bad influence on the whole market. As may be imagined, it is easier to depress rates than it is to raise them. Charterers of ships whose business it is to have their cargoes carried on the cheapest terms naturally make use of the quotations which are said to be the ruling rates. Consequently, although a loss may be incurred by a subsidised ship it is borne by the Government of

the country to which the vessel belongs, whereas with ordinary ships the loss falls on individual resources. The influence of subsidised shipping must, therefore, be thoroughly pernicious in its disturbing effects on ordinary commerce.

When the programme was being prepared for the World Economic Conference in July last, British shipowners realised that the subject of subsidising would have to be considered, for it could not be left out when efforts were being made to re-establish the commerce of the world. The payment of subsidies reduces the purchasing power of the taxpayers of the country which provides them, and it also curtails the buying power of the would-be purchasers of the goods overseas. As an illustration of the point, Great Britain has somehow to meet the difference between the cost of her imports of foodstuffs, raw materials for manufactures, and merchandise of all descriptions, and the amount realised for her exports, by the interest on investments abroad and the payments for services rendered, these latter items including shipping and insurance and representing invisible exports. If the accounts do not balance she must restrict her imports, and that means less buying of the produce of other countries. It is notorious that the payments for shipping services rendered to other countries have dwindled very seriously within the last few years, owing partly to the unprofitable level of freight rates and partly to the larger share taken by vessels belonging to the countries with which Great Britain trades, the ships in many instances being subsidised.

In 1920 this contribution amounted to £340,000,000, and it was then more than sufficient to counter the adverse balance of visible trade. By 1931 the figure had fallen to only £73,000,000, and the Chamber of Shipping estimated that for 1932 the contribution could not have been much more than £60,000,000. Invisible shipping exports represent the earnings of British ships engaged in the foreign trade, less their expenditure in foreign ports, and they have no reference to the profits or losses which have been made. The explanation is necessary, because British shipowners, who have only too much reason to know the heavy losses that have been incurred in recent years, have been critical of statements which seem to suggest that profits have been realised.

The question of shipping subsidies was raised, therefore, at the World Economic Conference because of the realisation in Great Britain and other countries that they were dislocating commerce and preventing a return to the establishment of direct relationships between those who have goods to sell in one country and those in other countries who would like to buy them.

United Kingdom Memorandum.

Consequently the United Kingdom Delegation submitted to the committee dealing with the subject a memorandum which recommended that an endeavour should be made to reach agreement on certain lines. These proposals were set out in two paragraphs. The first declared that State subsidies for the construction of shipping

for, or its maintenance on, competitive routes was uneconomic, and that it could lead only to the granting of similar subsidies by other countries and/or to protective measures in respect of shipping. These, it was maintained, would deprive world trade of the economic and efficient sea transport it had so far enjoyed, disorganise the world freight market, increase the burdens on national budgets, and lessen the power of maritime countries to pay in services for imports and loans. In the second paragraph the committee suggested that the countries concerned should move as rapidly as possible towards the diminution and ultimate abolition of State assistance to shipbuilding and to ship operation on competitive routes.

These proposals were supported by a long memorandum, in the course of which the delegation pointed out that the effect of subsidies was to increase the amount of tonnage afloat without reference to world requirements. Under treaties of commerce and navigation, to which most countries are parties, there is laid down the most definite national treatment for shipping. Subsidies, the delegation contended, constitute a kind of protection which was not contemplated when the present form of these treaties was elaborated. The older methods of flag discrimination, it was pointed out, are practically non-existent to-day (Portugal has announced her intention of abandoning them), but the grant of subsidies on competitive routes really amounts to a dumping of shipping services which tends to render nugatory the navigation conditions of treaties, and is contrary to the spirit of the Maritime Ports Convention. The statement added that the history of the last few years had shown a marked extension of the policy of subsidising shipping and that the continuance of the present methods could result only in increasing the uneconomic condition of world shipping, with disastrous consequences to all concerned.

Qualifications by Continental Nations.

Norway and Finland supported the proposals made by the United Kingdom and were in favour of the abolition of direct or indirect subsidies granted by a State for the construction and working of ships. The Netherlands also agreed with the Preparatory Committee of Experts that it was impossible to return to sound conditions in the shipping industry so long as the uneconomic policy of the Government subsidies continued. The French delegation held that special cases existed in which national protection of a mercantile marine by means of bounties, subsidies, or other advantages might be justified and could be regarded as legitimate; and they proposed that the Conference should explore the ways and means of regulating the practice of granting bounties, subsidies or indirect advantages, both public and clandestine, to shipping and should prepare a draft international convention to that end. The German delegation declared that, in view of the distress prevailing in all countries, the system was only natural for the maintenance and restoration of economic life within its boundaries, and argued that it would be useless to ignore the fact that unless normal conditions were re-

established in the international circulation of goods and capital no country could be expected to abolish measures which it had taken for the defence of its vital interests, and only those measures of support could be considered as subsidies which were intended to give an artificial and unnatural advantage to certain groups of producers at the expense of their foreign competitors. In the circumstances the Germans professed themselves unable to make final proposals, and they added that their decisions would depend upon how far other States were prepared to abolish, for their part, the measures they had taken.

On account of developments of quite other kinds, the Conference ended prematurely, and no definite results were secured on this question of subsidies. The most that was achieved was the circulation of statements condemning the system and memoranda indicating the points of view of different countries. Something was done, therefore, to make the position clear. It was shown that some countries were definitely opposed to the system, while others made qualifications in support of it. Events which occurred within a few weeks of the holding of the Conference showed that the idea of subsidies was still firmly implanted in some directions. There has been much discussion, for example, in France on a private Bill which proposed the subsidising of all national shipping on a large scale, contributions being partly calculated in proportion to working costs, including wages, and being partly based on the gross tonnages of the vessels.

South African-Italian Scheme.

In September British business men were amazed, and indeed shocked, to hear of a scheme entered into between a Minister of the Union of South Africa Government and Italy. The idea was a development of shipping services by Italian companies from South Africa *via* the East and West Coast ports to Marseilles and Genoa. An extraordinary feature of the arrangement was that the negotiations were conducted with the utmost secrecy and that even the Shipping Board, established in South Africa to advise the Government on shipping matters, knew nothing about it. The primary object was later stated to be the opening up of markets in Kenya, Uganda and other East African areas. The Italian lines were to receive an annual subsidy of £400,000, of which the Italian Government would pay £250,000 and the Union Government £150,000. An obvious comment made by the British lines was that the vessels already being employed between Mediterranean and South and East African ports were very poorly supported, and that if the Union Government had intimated a desire to develop trade with South Africa and West Africa they would have been glad to examine the question very carefully and delighted to find employment for surplus ships.

The proposed arrangement was especially remarkable since it was not only concluded between a member of the British Commonwealth of Nations and a foreign country, and was intended to promote objects which could have been achieved perfectly well by agreement

between the Union Government and British shipowners, but also encouraged the principle of subsidies. This was directly contrary to the policy of British shipping and of the British Government.

Italy must be regarded as one of the leading exponents of the subsidy system. She employs it on the liner routes and also in the cargo shipping industry. Consequently, there has occasionally been the spectacle of Italian vessels competing in the grain trade between Australia and Great Britain and accepting rates which would involve British owners in serious loss. Such an instance of the cutting of rates was much discussed in the early autumn of last year. A situation whereby a foreign subsidised vessel is enabled to upset the ruling rates in such a trade as that between Australia and the United Kingdom in grain obviously gives encouragement to the view that British shipowners must also ask for subsidies in order to put them on a fair competitive basis.

A Stiffening of Views

The failure of the World Economic Conference to condemn shipping subsidies, and the evidence that other countries were intent on pursuing the policy of subsidising, undoubtedly caused a stiffening of opinion among British owners, many of whom had been disposed to hope that foreign countries would tire of the practice. This hardening of view was indicated in the utterances of Lord Essendon, who has experience of many shipping routes, and is credited with desiring always to adopt a very reasonable attitude in business. If conciliation will achieve good results he will always, doubtless, be prepared to give full opportunity for this policy. Speaking at the first important shipping meeting of the year—that of the Houlder Line, in January—he said that subsidies would destroy themselves. Tariffs and restrictions were imposed at the expense of every nation engaged in international trade, but subsidies were at the expense of the nation that bestowed them. At the meeting of Messrs. Furness, Withy and Co., in July, he expressed the view that the spirit of nationalism (as exhibited by subsidising or by Government ownership) was wrong, and that, as things were to-day, mercantile shipping was just as much a matter for international agreement as disarmament or any other of the great variety of matters which were discussed between nations at the present time. Four, if not five, of the principal maritime nations were subsidising their mercantile fleets in one form or another, but it was extremely doubtful whether the benefits which they derived therefrom—if there were any benefits at all—were worth the cost to their taxpayers. At any rate, he was convinced that it should not be beyond the wit of man to evolve an international scheme of rationalisation, by laying up or scrapping a sufficient percentage of tonnage to ensure that the remainder could operate at a profit, and thus avoid the necessity for national Exchequers to pay losses or contribute subsidies.

The next important meeting at which Lord Essendon presided was that of Manchester Liners, in the middle of October, and he

returned then to the question of shipping policy. He outlined a policy that had been formulated, the basis of which was the restoration of international trade by the removal of the restrictions and barriers that were strangling trade. This, however, he recognised, was a slow process, and, in any event, the policy was not ideal because even though Great Britain had trade agreements with every nation in the world, as the result of which all barriers were swept away, shipping was so international in character that there would still remain all the barriers between other nations. Moreover, ships had to compete with the vessels of all nations, some of which were operated on a higher scale of costs and some on a lower.

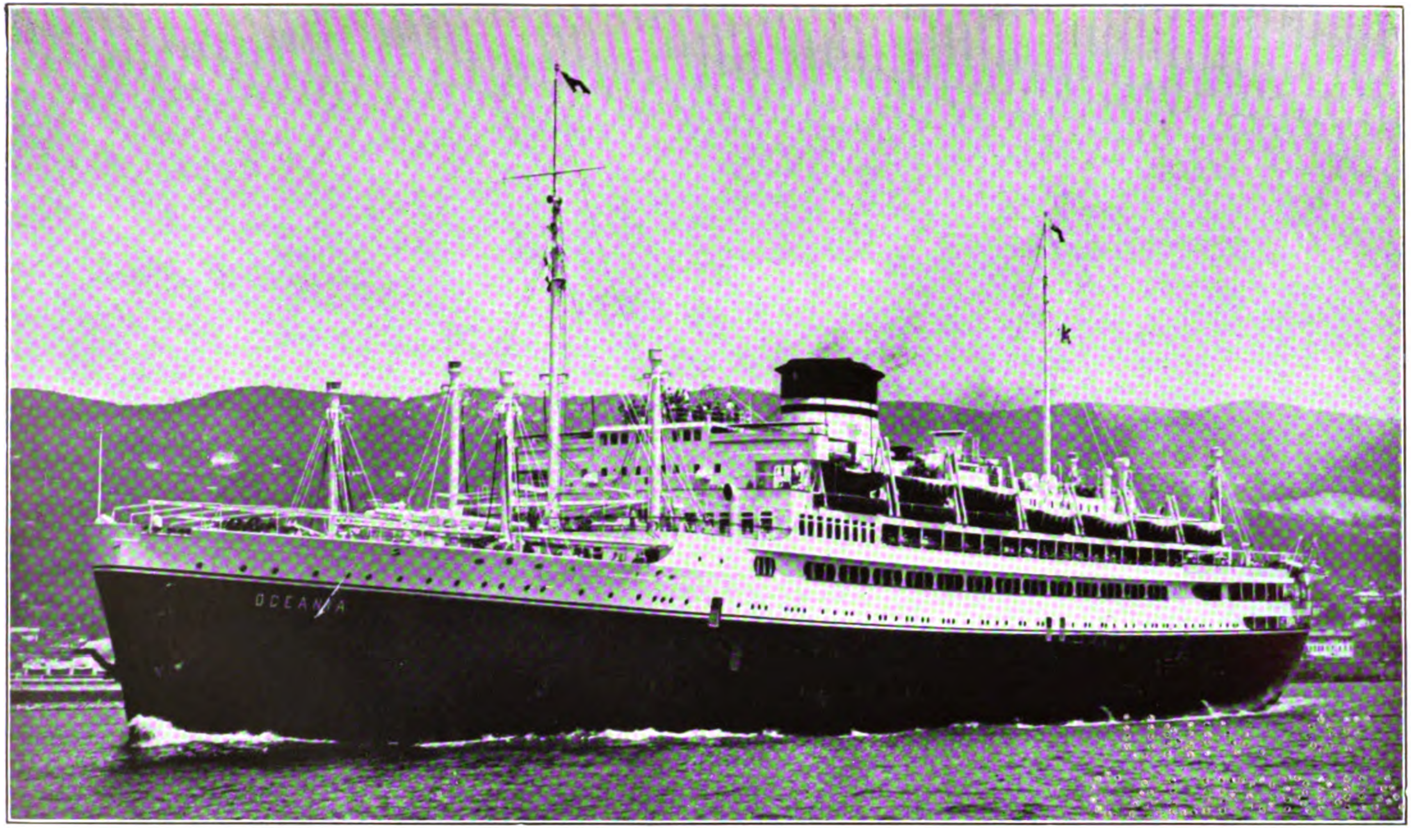
A Warning of Danger.

Lord Essendon proceeded to draw distinctions between subsidies granted "in the olden days" for the development of trade with a backward or growing Colony or Dependency, and the modern system of subsidies based on national aspirations to possess large mercantile fleets or on a real or imaginary need for the protection of a mercantile marine in case of war. The fact remained that several important maritime nations were subsidising their merchant ships, not necessarily for the purpose of carrying their own domestic commerce, but, in many cases, for entering into the general freight markets of the world. So long as these conditions existed it seemed to him hopeless for any shipowners who were solely concerned to operate their ships as a commercial venture to wait either for a restoration of international trade by the removal of restrictions and barriers, or for a change of heart on the part of those countries which were prepared to saddle their taxpayers with the burden of shipping subsidies. Such a policy of waiting on events was equivalent to leaving the British shipping trade to the survival of the fittest, and it seemed to him that it would merely be a question of time before there would be none fit to survive.

After referring to possible measures to meet the situation, Lord Essendon commented on "one practical remedy," namely, a suggested international agreement to restrict the supply of tonnage to the demands of the world's trade by laying up or scrapping the surplus ships. Other trades had rationalised, and he believed the shipping industry could do so, notwithstanding the very many nations which would need to be brought into co-operation. There was no remedy that had yet been conceived which had less difficulties or would more quickly be effective, but the problem must be approached in a spirit of mutual sacrifice for mutual benefit.

Committee of Cargo Shipowners.

The negative results of the World Economic Conference were an influence in focusing attention on the deplorable condition of British cargo shipping, and in October a large and representative committee of tramp owners throughout the country was appointed by the Council of the Chamber of Shipping specially to consider the position of



THE COSULICH LINE'S MOTORSHIP OCEANIA.

(Builders, Cantieri Riuniti dell' Adriatico, Monfalcone.)

this section of the industry. British owners realised that there seemed little immediate prospect of foreign Governments abandoning subsidies. The plight of many cargo vessel ownerships was also intensified. They had received advances from the banks which, apparently had been hoping against hope that the tide of trade would turn, and, in the absence of any signs of recovery, the banks were known in some instances to be exerting pressure which led to the sale of British ships. Many British vessels have been sold to foreign owners very cheaply indeed, and under foreign flags and with lower working expenses, whether in direct receipt of subsidies or not, they will be able to compete with British shipping in future. It is known that in representative cargo steamers of rather over 7,000 tons deadweight sailing under foreign flags, including those to which British ships have lately been transferred, the wage bills are less by about £5 a day than they are in ships flying the British flag.

It may be recalled that in the 1932 volume of "Brassey," Mr. Philip Haldin, a leading owner of cargo vessels, was quoted as expressing the view that measures would have to be taken to counter the foreign subsidising of shipping. In a letter published in *The Times* of January, 1933, he referred to a view, publicly expressed, that shipping subsidies would destroy themselves and were at the expense of the nations that bestowed them. The point was, he remarked, how long this process would take and to what state British shipping would be reduced by the time this desirable end had been reached. If it was not reached, he added, subsidies would not destroy themselves, but would, instead, destroy British shipping.

Imports of Foodstuffs.

It was clear that the Special Tramp Committee appointed by the Chamber would have much ground to cover and many suggested remedies to consider. Their discussions were important not merely to the shipping industry, but also to the shipbuilders, whose fortunes are closely related to those of shipping, and the state of the shipyards had reached a very low ebb indeed. The problems before the Tramp Committee were, indeed, important to the whole nation, which depends on supplies from oversea to the extent of about 70 per cent. of all its foodstuffs. Obviously there are considerations deserving the attention of the nation when the proportionate share of the trade with the United Kingdom is carried in foreign vessels, and when the supply of British tonnage is materially reduced. The returns of Lloyd's Register show that whereas the steam and motor shipping owned in the United Kingdom decreased between June 30, 1914, and June 30, 1933, by about 300,000 tons gross, the corresponding tonnage of the whole of the world was increased by 21,224,000 tons gross. The corresponding Board of Trade Returns indicate an unmistakable decline during the last three years in the British share of the trade with the United Kingdom.

To some extent the growth of foreign mercantile marines has been due to the transfer of vessels from the British flag, and there is a school of thought which maintains that restrictions should be put

upon such sales. Hitherto, owners desiring to dispose of vessels which were ageing have had the choice of accepting a price bid for the vessels to be broken up or a higher price offered by foreign buyers to maintain the ships in service. Although they may have been well aware that in selling the ships for future trading they were encouraging future competition they might reason that it was their duty to the shareholders to obtain the highest price possible. They would not be placed in the position of having to make such a choice if sales of vessels to foreign owners were prohibited. One suggestion made was that a financial pool should be formed, to which the Government would possibly contribute, out of which owners would be compensated for the difference in price when vessels were sold to be broken up instead of for service. A means of meeting the competition of vessels worked under foreign flags very cheaply is to prevent a supply of such tonnage from reaching them. The shipbuilding industry is interested in the subject, for if foreign owners were unable to draw on a supply of second-hand British ships those who had the funds might decide to build new ships on which, incidentally, a proper rate of interest would need to be earned. The position was a little simplified last year by a distinct rise in the prices for scrap material, which meant that the prices bid for old vessels were doubled within a few months. The demand for these ships came not only from British yards, but also from foreign sources, and Italy and Japan were large buyers of ageing tonnage.

The breaking-up of tonnage was on an unprecedented scale throughout 1933, and seems likely to continue in the immediate future. To some extent the tariff imposed on imports of steel to Great Britain has been very helpful by increasing the demand for scrap material. The removal of so much old tonnage from the registers is bound to have an effect on the shipping industry. A continued improvement in trade should help the demand for scrap and so stimulate the breaking-up of tonnage.

Effects of the Ottawa Agreements.

Last year was also noteworthy for the effects on shipping of the agreements between the British nations concluded at Ottawa in the previous summer. The full influences of those arrangements have not yet been felt, but there are already indications that important results may accrue. A reference made at the annual dinner of the Chamber of Shipping in February last by Mr. Walter Runciman, the President of the Board of Trade, was important, because he indicated that far from being inimical to other countries the agreements had set an example to the rest of the world of what could be gained by amity and accommodation.

A main object of the agreements was to help to get international trade again flowing in larger volume, and from this policy all should benefit in the long run. In so far as commerce between the different British nations and between Britain and foreign countries was concerned changes were brought about, some of which were bound to be disturbing. Part of the policy pursued at Ottawa was the encourage-

ment of production in the United Kingdom. This, which included an attempt to maintain, or raise, prices for producers in the United Kingdom, involved restrictions on supplies from abroad, including both the British Dominions and other countries, and notably imports of meat. Broadly, such restrictions were bound to affect transport, which had been provided without regard to such limitations. One point made clear, as the result of early experience with this policy, was the importance of letting shipping managers have full notice of changes in order that vessels sent long distances in the expectation that there would be full cargoes for them might not find that the supplies were less than had been expected. The introduction of the quota system meant that shipments which would have been forwarded normally during particular periods of the year were, in some cases, deferred so that cargoes which would have been available for ships ready to transport them were left for others that might have to be specially dispatched to convey them. Arrangements of this kind will be easier to carry out when more experience has been gained with their working.

That the arrangements were not without their drawbacks to British shipping and associated industries was indicated by the chairman of one group of companies who stated that the loss of freight for these enterprises in the South American trade when the restrictions took full effect would be in the neighbourhood of £130,000 a year. Obviously, such a decline in revenue will affect employment and the money spent in British ports as well as in the foreign loading centres. Charges in this trade led to a desire of certain ownerships to extend their activities to the Australian and New Zealand trades. There were one or two notable developments of the kind which necessarily were not without results for companies that had long concentrated on serving those routes. Happily, there were indications that, largely in consequence of the measures taken to improve her economic situation, Australia was being able to import rather more, and ships were leaving the United Kingdom for the Commonwealth with not quite so much vacant space as previously. The outward trade to Indian ports also showed a distinct improvement during the second half of the year.

Various movements indicated that trade with Canada was being influenced. It is true that during an early period of the year exports from the United Kingdom to Canada declined, although not to the same extent as imports from other countries. The curious effects of changes in commerce were also indicated by larger shipments of anthracite coal from Great Britain to Canada, which meant the employment of a larger number of tramp vessels. These ships competed with the regular liners for homeward cargoes of grain from Montreal, with the result that homeward rates fell to a very low level, to only 1*s.* 1½*d.* a quarter to the United Kingdom, representing merely 5*s.* 3*d.* a ton for ocean transport of 3,000 miles including handling charges. During the later months of the year more lumber was shipped from the Pacific Coast of Canada to the United Kingdom, and one cargo vessel brought the largest individual shipment to London over known.

On the whole, there were signs that the regular cargo liners were beginning to do rather better than for some time past. The Suez Canal traffic showed a distinct expansion. This improvement lent some encouragement to the hope that in due course the ordinary cargo vessels, or tramps, would also benefit. Their position is, however, complicated by the great surplus of efficient tonnage, the shutting or partial closing of Continental ports to grain imports, the increased diversion of foreign ships to trade with the United Kingdom, and the heavy subsidising of shipping by foreign Governments. Incidentally, a particularly glaring example of unfair competition was seen in the liner services between the Pacific Coast of the United States and Australia and New Zealand. On this route British vessels have to face the competition of American ships, which not only receive large United States subsidies, but also enjoy the advantage of a monopoly in the so-called coastwise trade between the United States and Honolulu, while being able to participate in the services between Australia and New Zealand. These remarkable anomalies were receiving the careful attention of the Australian and New Zealand Governments.

Subsidies Suggested.

The cargo section of British shipping, as already indicated, reached a crisis, and the whole position was examined thoroughly by the Tramp Committee of the Chamber of Shipping.

This body reported on December 7, the day following a strong speech delivered at the annual meeting of the P. and O. Company by Mr. Alexander Shaw, its chairman. Its members described the plight of their section of the industry and the causes which had brought about the crisis. They expressed the view that the paramount need of British shipping was more cargo, and that this was the only stable and permanent cure ; but that, while this might tend to come naturally, it would come very slowly and British tramp shipping could not wait indefinitely for it. If that shipping was to survive, some definite action must be taken forthwith.

Accordingly, the Committee recommended that the Government should be asked to grant a temporary subsidy with the object of equalising the advantages enjoyed by foreign competitors through subsidies, depreciated currencies, and lower working costs. They suggested an operating subsidy at the rate of 10*s*. per ton gross per annum to every British tramp ship engaged in international trade on a *pro rata* basis per day for each voyage with cargo, or in ballast if genuinely undertaken to secure cargo. They recommended that the subsidy should be paid from the day of signing on a full crew until it was signed off, as they considered that this would promote the employment of British officers and seamen, of whom it was estimated 40,000 were unemployed. They also proposed a laying-up subsidy at half the rate of the operating subsidy, i.e. 5*s*. per ton gross for a minimum period of thirty days' laying-up.

The Committee found that the two forms of subsidy would cost about £3,000,000 a year, representing about half the rate of subsidies

paid by some foreign Governments to their tramp owners, and they remarked that it might be compared with a corresponding figure for beet sugar and with a subsidy on home-grown wheat, which for the year ended July, 1933, amounted to over £4,000,000. Of course there would be considerable benefits to be set off against the subsidy payments, including a large sum representing a direct saving in seamen's unemployment pay. The Committee made other suggestions, such as the reservation of British preferences on Empire-produced goods to goods imported in British ships; discriminatory Customs duties on cargo imported in foreign vessels; and a licensing system for cargo to and from the United Kingdom as a means of promoting the employment of British tramp shipping. In commending such remedial measures the Committee emphasised the importance of a temporary subsidy and were content to leave the others to the discretion of the Government. The coasting tramp members made it clear that they gave first place to the policy of reservation of the coastwise trade, but submitted alternatives in the event of such reservation proving unacceptable.

In the course of a resolution adopted by the Council of the Chamber of Shipping, the point was emphasised that the paramount need of British shipping, as of all shipping, was the restoration of world trade by the removal of restrictions and uneconomic practices, including subsidies. They were of opinion that, as the World Economic Conference had failed to announce economic disarmament or to denounce subsidies, and as the prospect of the removal of these was remote, the time had come when, as a temporary measure, subsidy might have to be met by subsidy.

They, therefore, recommended that the Government should be advised that when any section of the British mercantile marine could show that a temporary subsidy was necessary and would ensure its preservation for the time the Government should favourably consider a grant of such temporary assistance.

The action at the Chamber, coupled with various authoritative statements, notably those of the P. and O. chairman, had the effect of causing the public to realise the serious extent of the crisis and the practical concern of the whole nation in the problem. The Government had indicated that they were ready to give the fullest consideration to views agreed by the industry, and the keen interest of Members of Parliament in the subject was shown in a discussion which took place in the House of Commons on December 13. The President of the Board of Trade then suggested that it was for the shipping community as a whole to find acceptable means which they could recommend to the Government with certainty as ensuring that any financial aid given would not be dissipated or used for the benefit of those it was not intended to benefit.

CUTHBERT MAUGHAN.

CHAPTER X.

BIG *VERSUS* SMALL SHIPS.

THE polemics of shipping appear to be always demanding a controversy in which one side or another must be annihilated. Thus there have been the issues of coal *versus* oil, of steam *versus* Diesel, and, to go farther back, of steam *versus* sail and even wood *versus* iron.

The last-named was settled by the effluxion of time—and the introduction of steel. Yet all the competitors survive, for Lloyd's Register shows that there are 1,140 wood and composite steamers and 1,323 iron steamers still in the world. There are more than 2,000 sailing ships. Coal is burned in at least 20,000 steamers, and there are nearly 5,000 motorships on the high seas. No one can forget the bitterness with which the respective arguments were carried on, nor the certainty in the minds of the two sides that their opponents were on the verge of extinction.

Last year the cudgels were taken up on behalf of—or against—the big ship. The big ship was either vital to our existence or a menace to the economic fabric of the nation. Matters got somewhat personal, too, and it became a case of championing either the Cunard or the White Star, both of which must often have prayed to be saved from their friends.

It has been boldly assumed (*a*) that if you have fast superliners the world is complete without slower cabin-class ships, and alternatively that (*b*) if some cabin-class ships have been phenomenally successful, then the public demand is for the slower ship only. The fact that new ships like the Bremen, Europa, Britannic, Georgic, Manhattan, Washington, Lafayette, and Champlain have all been popular does not seem to have occurred to the two sides, nor that immediately these ships are considered four countries—Germany, England, America, and France—come into the picture, nor even that some of the smaller and slower ships need subsidies to keep them on the seas. Italy might also have been brought upon the scene. The Hamburg-Amerika Line put on a fleet of comfortable but slower ships, but they are now being lengthened in addition to having had an extra turn of speed given them. The lesson of the Asturias and Alcantara on the South American route shows how the Cap Arcona, coming about two years later, has made it necessary to change the engines of the two motorships to gain extra speed. The entry of a fast Italian ship on the Indian Ocean caused a flutter of excitement on that route. The Canadian Pacific will probably say that their greatest achievement has been the largest and fastest steamer on their Atlantic run.

In these few lines the issue has therefore become very involved, because examination of the results is likely to show that some of the big fast ships have paid and that some of the smaller and slower ships have also paid, even under present conditions.

History has a long series of conflicting examples. The Great Eastern is a tragic condemnation of the mammoth ship. It would be interesting to place alongside her record what the White Star Line really think of the Oceanic, or the influence of the Kaiser Wilhelm der Grosse. What might have been if the Olympic, Titanic, and Britannic with the Imperator, Vaterland and Bismarck had had their sway, free from the tragedies which surrounded their evolution? The Cunard believed that the slower and smaller ships were the right thing to build after the War; hence their "Scythia" class. The White Star had ambitions of a mammoth ship. Its keel was actually laid with pomp and ceremony at Belfast, but a change of policy introduced, instead, the two motorships which have been deservedly popular.

The fifteen post-War years which have witnessed these violent changes do not presage the ability of even the keenest shipping managements to forecast infallibly the moods of the future, any more than do the records of the North Atlantic from the Great Eastern onwards to the outbreak of War. A new turn appears to be that responsibility is thrown on the shoulders of the financiers and their economic advisers. Yet the history of the past fifteen years, during which the economists have had such a wonderful reign, does not suggest that they know a whit of what Samuel Cunard or Thomas Ismay knew of the North Atlantic.

There is one aspect of the matter upon which commentators have rarely said anything. It is the mail service. That semi-obscure network of communication, which everyone takes for granted—from the dropping of a letter through the slot of a vermilion iron box to its delivery, at home or abroad, with all the intricate organisation that is demanded—is overlooked. Prestige attaches to the country with a fast mail service. There are vital commercial interests involved in the arrival an hour or two ahead of competitors of the valued contents of a commonplace envelope, and all last year he who wished to speed his letters to New York had to watch, not alone the British sailing list, but often the French and the German, and, in a formal way, write on the outside of the wrapper, for the guidance of the Postmaster-General, "By German Packet," or "By French Packet."

He who has no use for speed has not had the excitement of catching the American mail with an important dossier untransmittable by cable. There is only one means, so far, of getting such documents across the Atlantic—by the speediest ships; and when the Bremen or Europa is due to leave Southampton on the same day as, say, the Olympic or the Aquitania, there is only one possible answer to the question of even a patriotic Briton when hours count.

Those who like to ponder over such things may care to bear in mind that an 18-knot vessel takes about 7 days 7½ hours from Cherbourg to New York; one of 22 knots, just under the six days;

of 26 knots, an hour and a half over the five days; and of 32 knots about 4 days 2½ hours. The difference, therefore, between the Georgic and the Bremen is likely to be three days in favour of the latter. If we are to give up speed definitely and for ever, then we hand over our most urgent business communications to other Powers, paying them special rates and giving them a privileged form of consignment. The passenger in a hurry, too, has no alternative, and there can be no call to his patriotism from the nation which fails to meet his needs.

One commentator has seen this point and bravely essayed a retort. "The whole trouble," he said, "seems to be that ship-building designers have confused speed with size. Speed is necessary to-day, but size is not a *sine qua non* in order to attain speed. We have seen that fact demonstrated in motor-cars and airplanes, in battleships and speedboats, but most of the shipbuilding designers are still blind to it." Evidently the brilliant designers of the Bremen and Europa were so too, when, notwithstanding the enormous developments in marine engineering and the reduction in the weight of machinery, horse-power for horse-power, since the days of the Mauretania, they decided to increase their ships by something like 20,000 tons in order to get the higher power and still find room for the passengers who have to foot the bill. Let the bold commentator take a trip to New York in a coastal motor-boat, or try to induce passengers to book by one of the world's fastest destroyers under the conditions which everyone knows exist in these small crack fliers. More interesting still, let him try to persuade a marine underwriter that a destroyer type of hull is one that can stand up to North Atlantic weather for even a year, let alone the 20 years and more which the passenger ships have to last. The fact is that the brains of the cleverest naval architects and marine engineers in the world have failed to unlink speed from size in passenger ships.

The passenger might, perhaps, in this controversy, have been treated with a little more respect. After all, he is a factor of some importance in contributing towards the running costs, even if, in some countries, he cannot have all his amenities without the owners going cap in hand to their respective governments. That, however, is a habit which some shipping concerns have. They do it in various forms, direct or indirect; sometimes only during construction; sometimes, though less rarely, only during the running life of the ship; and often both "before and after."

It is the boast of some owners of the latest type of cabin-class ship that, with hot and cold running water in the third class, there is little distinction between the various grades. Small wonder, therefore, that passengers who can book by these ships, at much lower rates than by the 20-year old mammoths, prefer the more modern decorations and amenities with which they are surrounded. They might even, although not much is heard about it, prefer them to the 20-year old cabin-class ships. All of which suggests that in addition to the complications which arise, or should arise, during a discussion of what is really a very involved issue, someone might have said something seriously about the very chaotic state of a

trade route which has allowed an inferior appellation to a superior standard of travel and permitted an obviously inferior ship to be compelled to go about calling itself first-class and charging higher rates, not because the passengers really demand it, but because the companies themselves had been unable to agree who should drop which, or something of that sort. It is not the case that passengers like the smaller ship because she is slower, or the slower because she is smaller, or even the larger because she is faster, or, perhaps, the faster because she is larger. It is because of considerations which are incapable of exact analysis since all of them are not assessable at the same time. Psychology, national pride, fashion and financial means are some of the complications, although shipping history teaches that on the North Atlantic, even more than on any other trade route, national pride sways the least. How else can the popularity with Americans of non-American ships be explained?

Always there have been fashionable ships. All the leading North Atlantic companies have had their ups and downs through them, and no one can say with any positiveness what will be the popular type of ship five years hence. It may be the largest and fastest; it may be a large but slower ship; it may even be a smaller, slower and comfortable ship. On balance the largest and fastest has always had a good run for its money, not so much because it was large as because in order to be fast it had to be large. There must, some day, be a limit to size, and that limit had often been prophesied to have been reached as each new type was introduced. There were shakings of the head when many of the present-day ships were being mooted. The ships stand, and their owners with them, but not all companies have survived the financial strain; the Guion Line and the Collins Line are but memories to-day.

That is really as far as the controversialists can go at present. They still have an unbridled run of more than a year, for, presumably, no 1,000-ft. liner will enter service before the spring of 1935. Thereafter there will have to be running experience, and by then some one may know something about financial stability. On that depends a great deal of the North Atlantic traffic. The first 1,000-ft. ship to be launched is the Normandie, which, in most of the discussions, seems to have been sadly neglected. It might have been thought that this ship would have started another controversy—electrically propelled *versus* something else. Perhaps, that is only a controversy deferred, and the scribes feel they have enough and to spare until 1935 in the big and small ship argument.

"VIATOR."

CHAPTER XI.

The Netherlands Merchant Marine.

Holland can rejoice in a tradition as a seafaring nation many centuries old. Being situated in the midst of the most densely populated part of Western Europe and having free and open access to the principal sea routes of the world, Holland is, as it were, predestined to play an important part in world shipping, and this the more so from the qualities and character of the population, who from time out of mind have been accustomed to the sea and its elements, from which their dwelling places, again and again threatened by floods, had to be wrested. As agriculture and industry did not offer a sufficient means of existence, a great many Dutchmen were compelled to try their luck in commerce and navigation. The political and economical power, great for such a small country, that Holland exercised in the seventeenth century, and the flourishing culture accompanying this material welfare, owed much to its shipping. At that time the Dutch were the freight carriers of the whole of Europe. The Baltic trade, the trade to the English and French coasts, and that to the countries on the Mediterranean Sea and the Levant were for a time wholly dominated by the Dutch navigators. This is evident from the percentage of the Dutch flag in the total traffic through the Sound, which amounted to 50–70 per cent. in the eighty years 1578–1657, a period for which very accurate data are in existence. At that time Amsterdam was the centre of world commerce, from which goods were distributed to all parts of Europe.

The spirit of enterprise of the Dutch people was developed just as much by the various voyages of discovery. After the northern route to the East through the Arctic Ocean had proved impossible, Cornelis Houtman succeeded in reaching Java in 1596, sailing with four vessels in 446 days via the Cape of Good Hope. In his search for a North-West Passage, undertaken on behalf of the Dutch East India Company, Hudson in 1609 entered the river named after him, and laid the foundations of a permanent settlement, called New Amsterdam, afterwards New York. About the same time the Dutchman Le Maire found a new passage south of the Strait of Magellan. It was also Dutch navigators who discovered the fifth continent and gave it the name of New Holland (now Australia). The Dutchman Tasman was the first to set foot ashore in New Zealand and van Dieman's Land (Tasmania). The trading area of the Dutch East India Company, founded in 1601, extended from Cape Colony, of which van Riebeek was the founder, to Japan.

In those glorious days complete freedom in commercial shipping

prevailed ; the flag of the sea carrier had no connection whatever with the country of origin or of destination of the goods carried. Shipping was really international. So the Dutch lent services of sea transport to all countries and nations. The decline of the Dutch mercantile marine in the eighteenth century was caused largely by the development of the protectionist system, which brought about a total change in sea trade. The English Navigation Act, which stipulated that goods could be imported into Great Britain only by British vessels or by ships owned in the country from which the goods came, and which remained in force during two centuries, meant a heavy blow to the Dutch merchant fleet. Under the protection of this Act, however, England developed as the most important seafaring power of the world. In France preferences were granted to national ships, and the Scandinavian countries and Russia also began to count at sea. The once powerful town of Amsterdam was surpassed by London and even by Hamburg as a market and commercial centre. No fewer than four times war was carried on against the English. In the beginning the Dutch were successful and their famous heroes of the sea gained many victories, but later they had to acknowledge the supremacy of the British at sea.

At the close of the eighteenth century Dutch shipping had fallen into decay ; the continental system of Napoleon ruined what was left of shipping and commerce in the Netherlands. In the course of the following century the commercial activities of Holland gradually recovered. The Netherland Trading Society, founded in 1824, which was charged by the Government with the transport and selling of colonial products, gave a welcome opportunity to earn remunerative freights to the sailing-ships which were built in great numbers in the first part of the nineteenth century. About 1860, Holland took the fourth place among the sailing fleets of the world, with 2,000 vessels.

In the second half of the nineteenth century two new factors laid the foundations of the modern Dutch mercantile marine—the substitution of steamers for sailing ships, and the abolition of protective navigation Acts and general adherence to the principle of free trade.

The application of steam power encountered much opposition, so that a comparatively long time elapsed before Holland adopted this method of propulsion on a moderately large scale For many years her steamships operated only on a few lines—to London, Hamburg, and Antwerp—though later they traded also to Baltic and French ports.

In the beginning the circumstances were far from favourable for the development of steam navigation. It was very difficult for ships with a somewhat great draught to reach Amsterdam, as they had to enter the harbour either by the shallow Zuyderzee or by the long and narrow canal through North Holland. Only the digging of the North Sea Canal, which was opened for navigation in 1876, created an opportunity for the expansion of maritime traffic. This has since been widened and improved several times. In 1930 the construction of a new lift-lock at IJmuiden was completed, so that

now two locks suitable for large ships are available. The new lock, which is 400 metres long, 50 metres wide, and 15 metres deep on the sill, is the largest in the world.

Rotterdam too had to suffer from defective communication with the sea. By reason of continuous silting-up of the estuary of the Meuse, the entrance from the sea to Rotterdam was difficult, and ships had to make several detours in order to reach this town. The construction in 1871 of the New Waterway from Rotterdam to the Hook of Holland brought great improvement.

From the time of the digging of these canals, when after years of relapse the spirit of enterprise seemed to revive and to be directed once more to shipping, dates the establishment of steamship companies for the purpose of organising regular services to oversea countries.

Modern Development.

In the beginning of the twentieth century Holland took a more prominent place in world shipping. In 1900 the Dutch commercial fleet ranked ninth among the merchant navies and amounted to 530,277 tons gross, or 1·8 per cent. of the world merchant fleet of the time. In 1914 the tonnage under the Dutch flag had risen to 1,496,455 gross tons.

The greatly increased demand for sea-going tonnage during the War caused a great number of shipbuilding orders to be placed, so that in the year following the Armistice the Dutch commercial fleet increased rapidly. With great energy the Dutch shipowners sought to strengthen their position in the world ocean trade; various new liner services were called into existence, and in all directions the maritime spirit of enterprise was displayed once more.

Table I.

Year.	Steam and Motor.		Sail and Barges.		Total.		Percentage of World's Tonnage.
	No.	Tons.	No.	Tons.	No.	Tons.	
1920 .	922	1,773,392	65	20,004	987	1,793,396	3·1
1925 .	1,046	2,587,789	53	13,042	1,099	2,600,831	4·0
1930 .	1,381	3,079,000	20	7,315	1,401	3,086,315	4·4
1931 .	1,410	3,111,357	19	6,813	1,429	3,118,170	4·4
1932 .	1,424	2,957,195	21	6,645	1,445	2,963,840	4·3
1933 .	1,392	2,758,812	21	6.645	1,413	2,765,457	4·1

Table I. shows this growth of the commercial fleet, which not only increased in quantity, but also improved in quality and efficiency. This is evident in the first place from its composition according to age.

In 1931 ships not exceeding the age of five years formed the largest section of the Dutch fleet (25·3 per cent.). Such a high percentage was surpassed only by Norway. In 1932 the proportion was not so high, because owing to the depression the replacement

of old ships by new ones had to be delayed. Although the tonnage in the class of age 10–15 years had become the largest (29·3 per cent.), the percentage of tonnage not older than five years remained the highest of all national merchant fleets, the Norwegian excepted. In 1933 the proportion under five years sank to 20·7 per cent., but Holland still occupied the second place after Norway (with 28·2 per cent.). Most of the tonnage under the Dutch flag now belongs to the class between 10 and 15 years, which represents 31·6 per cent. of the total tonnage.

The increase of motorships during recent years is remarkable; the motor tonnage now amounts to 25·9 per cent. of the total fleet. Only in the three Scandinavian countries can a higher percentage be found. How quickly this percentage has risen is evident from the fact that whereas the motor tonnage owned in Holland in 1923 amounted only to 96 ships of 76,322 gross tons, it consisted on June 30, 1933, of 514 vessels of 717,747 tons.

The tanker tonnage also greatly increased, rising from 115,804 gross tons in 1923 to 320,900 tons in 1933, or by 177 per cent. (vessels of less than 1,000 tons excluded).

In recent years the decrease of the tonnage by sale or scrapping has been a great deal larger than the increase by the construction of new vessels, as is shown by Table II.

TABLE II.

	Increase by New Construction or Purchase.		Decrease by Sale to Foreign Countries.		Decrease by Scrapping in Holland.	
	No.	Gross Tons.	No.	Gross Tons.	No.	Gross Tons.
1930 . . .	76	233,062	30	49,422	13	19,711
1931 . .	67	136,392	21	41,118	23	110,763
1932 . .	23	36,176	34	106,123	13	93,776

ORGANISATION OF SHIPPING INDUSTRY.

All sorts of shipping business are represented in Holland, but by far the most important are the liner companies, which own 70 per cent. of the total tonnage. In the general carrying trade are engaged 16 per cent.; for the carriage of oil are available 85 tankers of 323,448 tons, or 13 per cent. of the total fleet; while the towage and salvage services represent only 0·3 per cent. of the total tonnage.

The last named is a Dutch speciality, in which Holland is not surpassed by any other country. For oversea towage in particular exceptional skill and perfect seamanship are required The Dutch towage-services have succeeded in gaining the confidence of the whole world for the execution of unusually difficult and long tows; well-known examples are the towage of the huge floating-dock of 50,000 tons capacity for the naval base at Singapore and that of a floating dock of 17,000 tons from the Tyne to Wellington in New Zealand, the longest tow ever performed.

The Netherlands shipping lines encircle almost the whole globe.

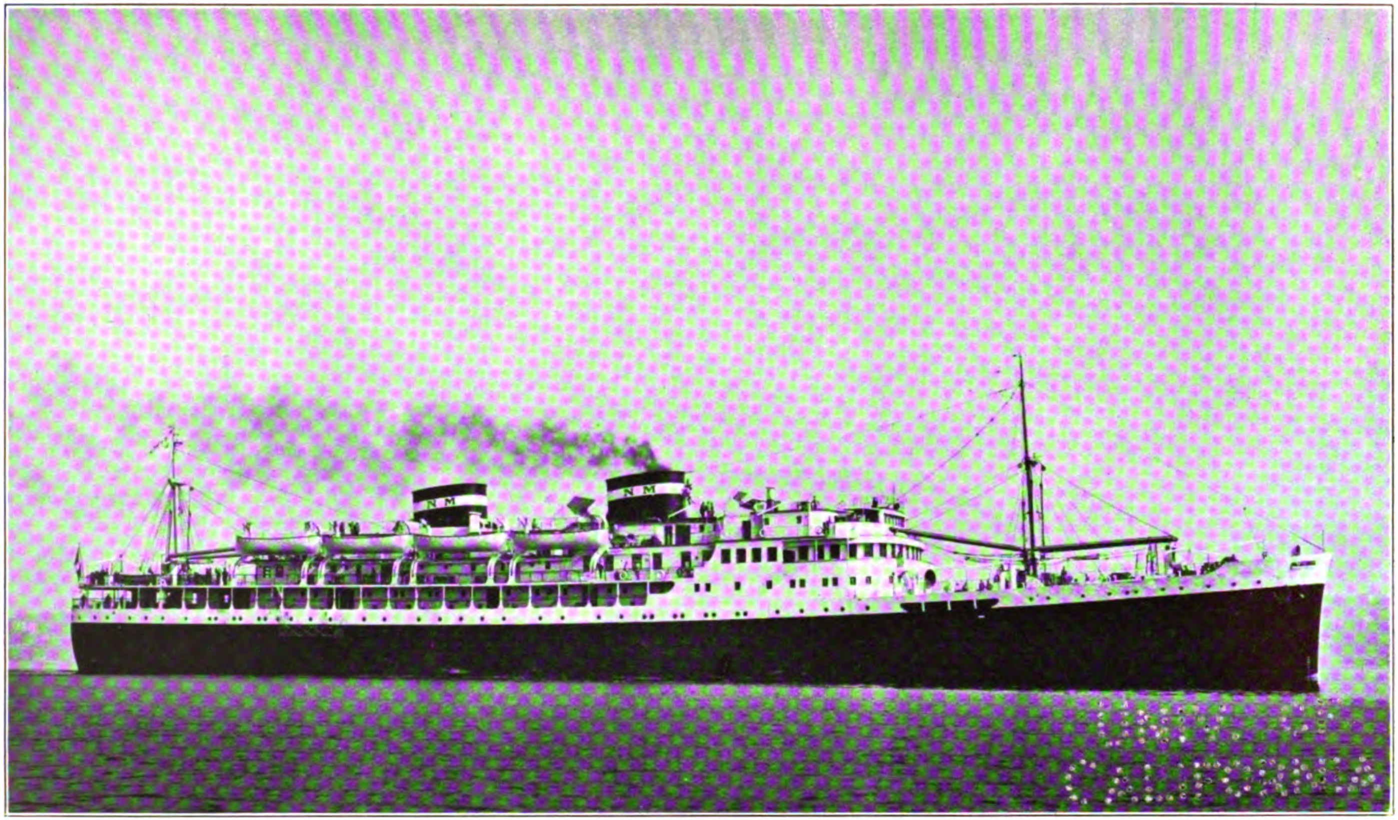
The "Nederland" Steam Navigation Company and the Rotterdam Lloyd maintain regular communication between Holland and the Dutch East Indies via the Suez canal. These companies have further established several branch services, which link the Dutch East Indies in the transoceanic traffic between the different continents in order to meet the geographical changes in world trade after the War. Thus the Java-New-York Line of these companies, in co-operation with the Ocean Steamship Company belonging to the Blue Funnel Line of Messrs. Alfred Holt and Co., maintains fortnightly sailings in both directions between Java and the East Coast of North America. The Silver-Java-Pacific Line maintains several combined services of the "Nederland," the Rotterdam Lloyd, and the Kerr Steamship Company between British India, Straits Settlements, Dutch East Indies, Philippines, and the West Coast to the U.S.A. and Canada. One of them has recently been modified to form a "round the world service."

The "Nederland" Steamship Company and the Rotterdam Lloyd possess a fleet of a very high quality. Their mail and passenger ships enjoy an excellent reputation for luxury, comfort, service, food, and safety. In 1930 four new modern motorships were introduced on the service to the Indies—the Johan van Oldenbarnevelt and Marnix van St. Aldegonde of the "Nederland" (each 19,000 gross tons), both built by the Nederlandsche Scheepsbouw Maatschappij at Amsterdam, and the Baloeran, built by the Scheepsbouw Maatschappij "Feyenoord" at Rotterdam, and Dempo, built by the Scheepsbouw Maatschappij "De Schelde" at Flushing (each 17,000 gross tons), of the Rotterdam Lloyd. Short cruises in these ships are very popular among tourists in the summer. The high-speed cargo motor vessels with limited passenger accommodation of these companies—"Poelau" ships of the "Nederland" and "Kota" ships of the Rotterdam Lloyd—form a special class.

The traffic between the Dutch East Indies and China and Japan is carried on by six regular services of the Java-China-Japan Line which in 1931 put in commission two new motorships of 9,230 gross, tons built by the Nederlandsche Scheepsbouw Maatschappij at Amsterdam.

The Royal Packet Navigation Company (K.P.M.), which is engaged in the inter-insular trade of the Indian Archipelago, also runs several lines with countries outside the Dutch East Indies. Before the War this company had established the Java-Australia Line, and other services link the Indies with Siam and South China, while two years ago a line was opened between Java and East and South Africa.

To return from the colonial trade to the mother country, a short survey may be given of the other principal services maintained under the Dutch flag. The Holland-American Line runs a regular service between Rotterdam and New York; its fleet includes the largest units of the Dutch merchant marine—the steamships Statendam (28,291 gross tons) and Rotterdam (24,149 gross tons). Other services under the same management connect Rotterdam with Cuba,



THE CIE. DE NAVIGATIONE MIXTE'S TURBINE STEAMER EL MANSOUR.

(Builders, Forges et Chantiers de la Méditerranie, La Seyne.)

Mexico, and Gulfports, and with the North Pacific Coast of the U.S.A. and Canada.

The Royal Netherlands Steamship Company (K.N.S.M.) has regular lines to the Baltic, Scandinavia, Hamburg, the Mediterranean, the Levant, and the Black Sea. This company runs several other lines to the West Indies, Central America, and the West Coast of South America. Its newest passenger liners are the steamship Simon Bolivar (8,000 tons) and the motorship Colombia (11,000 tons).

Communication between Holland and the East Coast of South America is maintained by the Royal Dutch Lloyd of Amsterdam with regular services to Brazil, Uruguay, and Argentina, and by the Rotterdam-South America Line, managed by Messrs. van Nievelt, Goudriaan and Co.

The Vereenigde Nederlandsche Scheepvaart Maatschappij (United Netherlands Navigation Company) has regular services to East Asia, British India, Australia, and East and South Africa, and a combination of three companies runs jointly the Holland-West Africa Line.

Of the many other shipping companies may be mentioned the firms of van Nievelt Goudriaan, van Uden, Vinke, Hudig and Veder, Erhardt and Dekkers, etc., which are engaged in tramp shipping, and the Dutch Steamship Company, the Shipping and Coal Company, Wm. Müller and Co., and others, which carry on the short sea trade.

The tanker trade is for the most part in the hands of the companies that belong to the concern of the Royal Dutch Oil Company and the American Petroleum Company (Standard Oil). The only owner running tankers on the open market is the " de Maas " Company, managed by Phs. van Ommeren Shipping Business, Limited.

Present Position.

Though its present position is not comparable with that it enjoyed in former times, Holland may again be ranked among the more important seafaring nations. Its commercial fleet is very large in proportion to the size of the country and the number of its inhabitants, though this cannot be said if allowance is made for the Dutch territories in Asia and South America, which amount to 772,000 square miles and have a population of 55 millions. For such a large colonial empire, the third in the world after Great Britain and France, an up-to-date commercial fleet is of vital importance. In quality the tonnage owned in Holland is not surpassed by that under other flags. The skill and ability of the crews are based on the old traditions that unite Holland with the sea and have become part of the national character.

A well-developed shipbuilding industry is able to build in its own yards ships of nearly any dimension and type that may be required. The shipbuilding interests of the country are promoted by the experimental tank inaugurated in 1932 at Wageningen, which has a length of 100 metres, a breadth of 10·5 metres, and a depth of 5·5 metres.

As already mentioned, the situation of the country is very favourable, its ports controlling the estuaries of the great rivers Rhine and Meuse, which form a natural entrance to and outlet from one of the most densely populated and most industrialised parts of Western Europe. The ports of Amsterdam and Rotterdam provide efficient facilities for dealing with cargoes of all kinds. They are admirably equipped and are attractive not only for their excellent land and water connections but also because they can assure quick and cheap handling of goods.

If there was a free and natural development of world commerce, the economical and geographical circumstances of the Netherlands would offer reasonable prospects for a prosperous shipping industry. When freedom of commerce and navigation reigned and the international character of trade was maintained, Holland was always a country with a flourishing shipping, because in those times its ability and capacity had free scope. The application of the protectionist system, however, injured the Dutch mercantile marine seriously, and now the nationalistic movement in the field of economics threatens to undermine the conditions of existence for a great part of the Dutch commercial fleet. This would be detrimental not only to those interested in the shipping industry and the numerous enterprises in Holland that depend on shipping, but also to the financial position of the country. Holland has to import many foodstuffs for its rapidly growing population and nearly all the raw materials needed for its manufacturing production. Consequently the imports always exceed the exports. The balance has to be made good by the lending to foreign countries of such services as the carriage of passengers and goods by sea, and if foreign countries do not wish to avail themselves of these services, the international balance of payments of the Netherlands is unfavourably influenced. This phenomenon now presents itself clearly. The net receipts of the national mercantile fleet were estimated at 196 millions of guilders in 1929, 155 millions in 1930, and 125 millions in 1931, but for 1932 were no more than 86 millions.

TABLE III.

GOODS TRAFFIC BY SEA (IN 1,000 TONS).

	Import	Export.	Transit Inwards.	Transit Outwards.
1929	12,282	6,960	21,010	13,400
1930	12,549	6,691	18,703	11,817
1931	12,424	6,485	12,467	10,860
1932	10,594	5,336	8,881	7,200

The import and export trade of Holland cannot provide adequate cargo for the national sea-going vessels. The deficiency must be filled by goods carried from and to regions outside the national territory, such as the German hinterland, especially Westphalia and Rhineland, for which the Dutch ports form the natural outlets to the sea. Table III. shows how large is the volume of transit trade in

relation to the import and export. In consequence of the crisis and the accompanying impediments to international trade, the traffic of goods in transit through Holland has shrunk greatly. The economic situation of the country has been severely affected by the fall in the prices of colonial products, the innumerable trade barriers, the quota systems, the rigid exchange restrictions and controls, debt moratoriums, and other means of economic warfare; above all, however, the economic and financial difficulties of Holland have been aggravated by the abandonment of the gold standard by Great Britain and the currency depreciation in a great many other countries.

For the shipping trade under the Dutch flag the fall of sterling has led to disastrous consequences. Freight rates, still quoted in British currency, were not raised, and it proved impossible to compensate for the depreciation of the pound by stipulating gold clauses or quoting freights in other currency than the shilling, which according to unshakable tradition always remains in force as the standard unit in shipping. Thus the voyage earnings diminished in the same degree as the gold value of the pound, *i.e.* by 30–35 per cent., whereas the cost of running Dutch vessels remained on the same level as before. The competing power of a country like Holland, which still adheres to the gold standard, is seriously weakened by this difference in monetary values; the fall in the dollar entailed a further dislocation of the shipping trade. Even before the financial crisis Holland was among the countries having a relatively high standard of living; now that the principal seafaring nations have gone off gold, the costs of Dutch shipping, especially as regards wages, have risen to the highest in the world, those of the highly subsidised American mercantile marine excepted. The only way possible for the Dutch shipowner to hold out against fierce competition is to cut down expenses, but this possibility is limited as long as the general level of prices remains higher than in other countries. The restrictions of international trade forced the Dutch Government to take a number of protective measures in order to defend the domestic agricultural and industrial interests. These measures prevent, however, the reduction of the cost of living that is needed by the export and shipping trade, and, moreover, lead to the result, undesirable from a shipowner's point of view, that the quantity of goods to be transported is lessened. The process of adaptation to changed world conditions is beset with many obstacles.

The degree to which Dutch shipping has suffered from this disequilibrium between the various national levels of cost and the inequality of competitive conditions is indicated by Table IV, showing the laid-up tonnage registered in Holland and owned by members of the Dutch Shipowners' Association (excluding the ships registered in the Dutch East and West Indies). The percentage of idle tonnage under the Dutch flag is generally higher than the percentage of laid-up tonnage of the total world fleet, which at the beginning of the third quarter of 1932 was estimated by the "Daily Freight Register" at 19 per cent., and also considerably higher than the percentage of the laid-up tonnage in countries that abandoned the gold standard.

TABLE IV.

	Number.	Gross Tons.	Percentage of Total Tonnage.
January 1, 1932 . . .	167	781,514	33·7
April 1, 1932	174	775,699	34·1
July 1, 1932	180	808,913	36·3
October 1, 1932	181	844,869	38·2
January 1, 1933	165	782,358	36·3
April 1, 1933	159	735,704	34·9
July 1, 1933	131	560,229	27·1

Besides the fatal consequences of the world crisis, the general disproportion between available tonnage and traffic requirements, and the high cost of running vessels, Dutch shipowners are severely handicapped by the various systems of financial assistance granted to their foreign competitors for the building and operation of ships. They are exposed to cut-throat competition from foreign shipowners, who by subsidies are enabled to cover their losses. The standing menace of this subsidy policy is, moreover, that sooner or later other countries will be compelled to take the same measures in order to protect their national shipping against this form of discrimination.

Holland has never been one of the countries in which public funds play an important part in the development of the mercantile marines. Direct aid to shipping has been restricted to the granting of advances to some companies that started sea communications on routes of special interest, and most of these advances have been repaid to the Government from the profits made by the companies in later years. The mail contracts between the Dutch Government and several shipping companies provide only payments not exceeding the cost of transporting mail.

Though by nature the Dutch shipowner is averse from any form of State interference with his business and will do his utmost to keep his head above water by his own energy, the alarming results of the crisis at last made it necessary that, assisted by the State, efforts should be made to prevent the ruin of the national mercantile marine. Therefore by a law of July 23, 1932, a credit institute was founded, named "Maatschappij tot behartiging der nationale scheepvaartbelangen" (Company for the promotion of the national shipping interests) with a nominal capital of 5,000,000 fl., of which 2,000,00 fl. are provided by the State. Shipping companies which receive assistance in the form of loans must take shares in proportion to their financial strength. Loans are granted only against sufficient security and payment of the current interest, and, moreover, shipping companies are subjected to various conditions regarding financial reorganisation and co-operation with others. This form of State aid is thus essentially different from the systems of direct and indirect subventions applied by various other nations, since only short-term loans are granted. The arrangement is of a purely emergency and defensive character, and is intended only to give temporary relief from financial difficulties under terms so hard not only for the shipping

company but also for its creditors that no shipowner will present a petition for assistance without the utmost necessity.

The Future.

The Dutch shipping industry is in a defensive position. Great efforts must be exerted to preserve the position gained in previous years. The immediate future depends wholly on the development of international relations, for the government of such a small country as Holland cannot do much for the restoration of world trade. The prospects for a speedy return of a free and unhampered exchange of commodities are, however, not encouraging. In most countries a tendency can be observed to make the national economic life as nearly self-supporting as possible and to confine international trade to goods that cannot be produced within the national territory. All such measures diminish the requirements for sea-carrying space and prevent economic employment of the existing tonnage. In spite of the present dark circumstances, however, confidence and hope still prevail in Dutch shipping circles, as is proved by the placing of an order by the United Netherlands Navigation Company for four combined passenger and cargo ships. This unabated spirit of enterprise is also shown by the opening of a new regular line between the Dutch East Indies and East and South Africa by the Royal Packet Navigation Company and the formation of a Dutch syndicate for aerial navigation initiated by two big shipping companies, which will investigate the possibility of putting into operation a regular service with airships between Holland and the Indies, a service which eventually will connect with a transatlantic airship line.

H. E. Scheffer
Assistant-Secretary, Netherlands
Shipowners Association.

CHAPTER XII.

The General Steam Navigation Company.

Formed in 1824, the General Steam Navigation Company claims to be the oldest sea-going steamship company in the world. Before any one had travelled along a railroad, in the sense in which the word is now used, its ships were sailing down the Thames under steam-power to various ports in Europe.

It is one hundred and nine years since a little group of City business men gathered in a private house at Custom House Quay. They were individually owners of packet boats, and it is of particular interest to note that among them was Mr. Thomas Brockelbank, who owned a steamship called the Eagle which plied between London and Margate. At that time they were no doubt called visionaries, for the project they met to discuss was no less than the formation of a large group or joint stock company, " for navigating by steam." This enterprise was described in the imposing language of the time as " profitable to those engaged in it by affording them the means of establishing between the United Kingdom of Great Britain and such places as may be deemed advisable a certain expeditious intercourse for the conveyance of passengers and merchandise, which the combined powers of capital and steam placed at their disposal will enable them under judicious management to accomplish."

Fully to place the ambitious project of the infant " General Steam " in its proper background, it is necessary to survey briefly the events of the time. For nine years before 1824, England had been suffering from high taxation, heavy debt, excessive prices, depreciated currency, much unemployment, the failure of foreign markets, and dangerous discontent. In Europe there was trouble with Russia, with Turkey, and with Spain, and England, as always, was trying to fulfil the role of peacemaker between the European countries. Then, in 1824, came definite signs of a revival. Debt and taxation were lessened, import duties on many goods reduced, and emigration of skilled workers permitted. Trade increased and goods became more plentiful, and, consequently, cheaper. It was an opportune moment for the birth of the new shipping company. But it had hardly been launched when, in 1825, the Republics of South America, released from Spanish rule, began to offer enormous interest on loans. Spurious companies were formed to exploit the natural mineral and other wealth of that continent, there was reckless speculation—and ruin ; and so local banks stopped payment, even the Bank of England barely managing to weather the storm. Wages fell, and there was again much unemployment. In such

circumstances, it is a matter for wonder that the "General Steam" actually paid a dividend of 16 per cent. on its first year's trading.

The magnitude of the ambitions of the founders, at the head of whom were Mr. Brockelbank, of Deptford, and Mr. W. J. Hall, will be realised when it is said that the original capital was £2,000,000. That would to-day be a large sum for any shipping company to have as initial capital, but 109 years ago it was colossal. The original intentions of the company are symbolised in the flag which was then adopted, and which to this day is flown at the peak of the mast of every G.S.N. steamer—the Globe on a white background. The founders visualised the ships which they were jointly to own as sailing to every part of the world, and though this dream was not realised, the G.S.N. emblem has been carried into every Continental port of consequence.

The first act of the newly-formed company was to buy two steam packets, the Lord Melville and the Earl of Liverpool. At the same time it ordered three steamers to be built, of 240 tons burden and equipped with two engines of 40 h.p., as passenger vessels to ply between Brighton and Dieppe, London and Yarmouth, and London and Ostend.

At the first half-yearly meeting of the shareholders, held at the City of London Tavern on August 11, 1825, it was announced that the company possessed no fewer than 15 steamers. It is interesting to read some of the advertisements issued by the company just over a hundred years ago. In these announcements special stress is laid on the facts that "all the packets have elegant state cabins for the ladies" and "refreshments may be had on board." The journey from London to Boulogne took 15 hours, to Calais 12 hours, and to Ostend 16 hours.

One obstacle met with by the company in those pioneer days was the tremendous prejudice against the use of steam power. Steamers were regarded as inventions of the devil, and mariners, watermen, and stevedores went out of their way to obstruct the newcomers. Navigation on the Thames was difficult because the river was crowded with collier brigs bringing coal from the Tyne. When the colliers reached the Thames they tacked or backed-and-filled all the way up the river. To navigate a steamer between these ranks of sailing ships was an intricate and nerve-racking task. Merchants, however, began to see the advantage of the steamer, with its speed and reliability, and freights increased by leaps and bounds, in spite of the further difficulty of trading restrictions, which made it compulsory at first for special arrangements to be made before the company could carry merchandise by steamship at all.

The original steamers of the company were wooden hull ships, and it was not until 1836 that its first iron steamer, the Rainbow, was launched. The Rainbow's officers had considerable difficulty with their compasses, which at that time were not insulated against metal surroundings, so that the needles were liable to point at a moment's notice in any direction—north, south, east, or west. By 1837 the company owned forty steamers. One of its steamers was

stationed at Falmouth to receive letters from wind-bound sailing ships.

In 1842, it received a signal mark of Royal appreciation, for in that year the young Queen Victoria sailed from Scotland to the Thames in the Trident, of 875 tons, built by the famous firm of Green, Wigram, and Green at Blackwall. Queen Victoria was greatly impressed by the Trident, and in a letter to her uncle, the King of the Belgians, written shortly after her voyage, she said, " We had a speedy and prosperous voyage home in forty-eight hours on board a fine large and very fast steamer, the Trident, belonging to the General Steam Navigation Company."

In 1852, the company purchased the entire fleet of the Germanic Confederation. This consisted of six steamers complete with guns and stores, and was, in fact, the whole of the then German fleet. Two years later one of its ships was chartered by the French Government for transport work in connection with the Crimean War.

At the beginning of this century, the General Steam Navigation Company sat down and "took stock." It found, among other things, that the original capital of £2,000,000 was unwieldy, and it proceeded to reorganise, the capital being reduced to more fitting proportions. Outside repairs to its numerous vessels having been found to be costly and to involve considerable delays, it acquired its own repair depot, purchasing for this purpose the East India Company's former depot at Deptford Creek. A little later it bought Brewers, Chester, and Galley quays and developed the wharfage to its present dimensions.

The Messina Earthquake.

One of the most notable years in the company's whole history was 1908, the year of the great earthquake at Messina, in Sicily. On Christmas Eve, 1908, its steamer, Drake, arrived at Messina to load fruit. Christmas Day was bright and fine, and the Chief Officer of the Drake records that he left the ship and walked round the town. On the following day work was carried out in the ship as usual, and there was nothing of any note to record. December 27 turned out a dull, depressing day with grey skies, and the Chief Officer records that he found it difficult to sleep on turning in that night. On the following morning, about five-thirty, the Drake's crew were awakened by a horrible rumbling noise. This increased to a roar, and the ship began to shake and heel over. When the men arrived on deck, having dressed hurriedly, they found themselves in pitch blackness, with the air full of suffocating, choking dust. On all sides they could hear the crash of falling masonry, and every now and then shrieks for help. The Drake heeled over to an angle of about 45 degrees. At last daybreak came, and the crew were able to see something of the damage the earthquake had caused. Messina was a total ruin, a heap of broken masonry. All available men were landed from the Drake in order to rescue those who had been trapped by falling buildings. All day they worked, digging people out of the ruins, until finally they had on board no fewer

than 317 persons, including 60 little girls from a convent school. With these people they set sail for Syracuse, where they landed the refugees.

For this exceptionally fine rescue work the master of the Drake, Captain F. J. Carter, received from King Victor Emmanuel of Italy the insignia of Officer of the Order of the Crown of Italy. He was also received in private audience by His Holiness Pope Pius X., and later by the Papal Secretary of State, Cardinal Merry Del Val. London honoured the Drake's officers and crew on January 21, 1909, when the Lord Mayor, Sir G. W. Truscott, and the Lady Mayoress and directors and officials of the company proceeded on board the Drake lying alongside Fresh Wharf. The Lord Mayor thanked Captain Carter and his crew for their wonderful work, and said they had done much to strengthen the affection and esteem which bound England and Italy together.

In the same year, 1909, the company completed the building of its new offices at 15, Trinity Square, and occupied them. These are still its headquarters.

As the years of the twentieth century passed, the company consolidated its trading position. New fast steamers were built and carried the General Steam flag into every leading European port. The black hulls, mahogany-coloured superstructures, and blue life-boats of its steamers were to be seen loading or discharging among the busy wharves of Hamburg, Rotterdam, and Antwerp ; alongside the wine sheds that line the banks of the Garonne at Bordeaux ; and at Oporto at the foot of the vine-covered slopes of the Douro. It was said with truth that three out of every four glasses of good brandy sold in London were brought thither by its steamers.

War Services.

It is no small wonder then that, on the outbreak of war in 1914, this fine fleet was prepared for any eventualities. On the evening of July 31, 1914, a telegram was received from the Admiralty asking for information concerning the latest movements and expected movements of all the steamships of the company. This was given, and at once no fewer than twenty-one G.S.N. ships were requisitioned by the Admiralty, and for four years were employed in mine-laying, mine-sweeping, carrying munitions, and transporting troops. The company's War record, indeed, was a very proud one. Seventeen masters, ten chief engineers, and eight second engineers received Commissions in the Royal Naval Reserve.

While the ships and men were actively engaged on the high seas, the directors were no less busy on war work. The late Mr. Richard White, at the time Chairman, served as Vice-Chairman of the committee of shipowners and others formed in 1917, when the submarine activities and depredations of the enemy were at their worst, to control the trade between the United States and the Atlantic islands, Portugal, Morocco, and the Mediterranean. Mr. W. J. McAlister, the present Chairman, served as Chairman of the London District Branch of the Home Trade Transport Control Committee, appointed

by the Board of Trade for the purpose of so organising the carriage of goods and traffic by water as to relieve the pressure on the railways. Another official of the company, now a director, Mr. Stanley Sparkes, acted as honorary secretary to the Mediterranean Committee, whose duty was to ensure that the ships plying on those trade routes were put to the most economical use, and that they carried only such goods as were essential to the conduct of the War.

The company had its first taste of the War on August 3, 1914, when three of its ships, the Auk, Iris, and Virgo, were detained at Cuxhaven by the Germans. Their officers and crew were transferred to a prison ship and eventually sent in cattle trucks to the German imprisonment camp at Ruhleben. Here also was interned during the whole of the War Mr. Robert Kelso, the company's joint manager at Hamburg.

It must suffice to quote only a few examples to show the dangers encountered by the company's ships and the sufferings of their crews during the War. On March 23, 1915, the Teal, commanded by Captain J. R. Herbert, had a brush with a German aeroplane when about 12 miles from the North Hinder Lightship. The aeroplane dropped bombs and steel darts, some of which struck the ship. Captain Herbert ordered his crew into shelter, and by steering a zig-zag course outwitted the German aeroplane.

A few months later the Groningen, under Captain J. Salmon, was attacked from the air off the Galloper Lightship. Eight or nine bombs were dropped by the aeroplane, but by manœuvring with engines and helm Captain Salmon saved his ship from serious injury. Later in the same year, three aeroplanes attacked the Balgownie off the North Hinder Lightship. Captain Goodson, on sighting the enemy, went into the chart-house to fetch his rifle. He then ordered full speed and steered a zig-zag course. Stationing the crew on deck round the deck-house, he directed them to fire distress rockets, and himself opened fire on the enemy with his rifle. For twenty minutes there was a running fight between the Balgownie and the German aeroplanes. Down below the engineers and the firemen worked hard to keep the steamer at full speed. No fewer than twenty-three bombs were dropped. Then one of the aeroplanes flew off, but the remaining two continued to send down showers of machine-gun bullets. The hull and the decks of the Balgownie were struck, the funnel was pierced, and the pipes on deck were riddled, but not a man was hit. Captain Goodson fired no fewer than fifty rounds at the German aeroplanes, and for his work on this occasion he and his crew received special commendation from the Admiralty.

The first of the company's ships to be sunk was the Oriole on January 30, 1915, followed by the Leeuwarden, Ptarmigan, and Groningen, and by the Balgownie early in 1916. On March 9, 1916, as the Fauvette was proceeding from the Downs towards the Thames she was blown up by two submerged mines. She sunk by the stern in four minutes, and fifteen men were lost. Less than a month later the Vesuvio, commanded by Captain Elgar, was off Beachy Head coming up-Channel, when her portside and bridge ware blown to pieces by a tremendous explosion. The master, second officer, and

helmsman, who were on the bridge, were never seen again, nor were the donkey-man, the fireman on watch, and the mess-room boy. Within ten minutes of the explosion the Vesuvio sank.

The next ship to be lost was the Gannet, which was blown up, probably by mine, off the Shipwash Lightship, near Harwich, eight men being lost. Captain Cole was the last to leave the ship; choked by the fumes of the explosion, he leaped into the water, where he was injured by pieces of cargo heaving on the waves. He was rescued by the second officer, and the survivors were eventually picked up by mine-sweepers.

Nearly a year passed before the company had its next casualty. On April 25, 1917, its steamer Hirondelle was sunk by a German submarine off the coast of Cornwall. The captain and crew were landed at Penzance. The next steamer to be lost was the Ortolan, and she was followed by the Heron and Drake, which were sunk by torpedo and shell-fire respectively, while in convoy, three days out from Falmouth.

Captain W. G. Braithwaite, had two exciting experiences during 1917. The Lapwing, of which he was in command, was sunk by striking a mine, and a few weeks later his command, Peregrine, was wrecked off the Sunk Lightship. He had on board a large number of French women and children, and when the ship went aground, the passengers became frightened, especially as the weather began to get very bad. "But," Captain Braithwaite wrote in his report to the company, "thanks to the splendid behaviour of the crew, and particularly that of Mr. Rutter, second engineer, Mr. West, third engineer, and S. Carter, apprentice, I was soon able to calm their fears." Mr. Rutter kept the passengers in good spirits by singing. Eventually, passengers and crew, including the present Catering Superintendent, Mr. Davis, were rescued by the Walton-on-the-Naze lifeboat. In all, the company lost 23 steamers during the War.

Reference must also be made to the War service of the Golden Eagle. Built in 1909, she was—and still is—one of the best-known Thames pleasure steamers. In February, 1915, she was requisitioned by the Admiralty and converted into a troopship, and remained a trooper and a seaplane carrier until November, 1919. During that time she carried 518,101 troops and other units, including 6,329 Chinese, 6,008 American troops, 2,704 returning British prisoners of war, and 3,998 hospital patients.

A memorial tablet erected on the north wall of the company's general office records the names of 99 employees who lost their lives on sea and land in the War. The memorial was unveiled on July 13, 1921, by Admiral of the Fleet Earl Beatty.

After the War came to an end, the company set to work to reorganise its business, for it must be remembered that for over four years its trade and passenger services had been suspended. In 1920 and 1921 no fewer than 14 steamers were built or bought, and offices were either reopened or established in Germany, Holland, Belgium, France, and Italy.

In 1919 the goodwill was acquired of the steamship service between London and the Humber belonging to Messrs. G. R. Haller,

and in the same year the London and Ghent service, conducted for many years by Messrs. Leach and Co., was transferred to the company. More recently, it has taken over the Bennett Steamship Company's interest in the Dunkirk, Calais, Boulogne, and Tréport services from London, thus re-establishing, after an interval of about 45 years, two of its original trades and linking up the whole of the cargo services between London and all the principal northern French ports.

Pleasure Service.

No sketch of the "General Steam's" long history would be complete without a reference to its pleasure steamer service, which has been run continuously between London and the Kent coast resorts for over a century. So far back as 1825 it was conducting a passenger service between London and Margate, in competition with the Margate Steam Packet Company, its ships being the Royal Sovereign and the City of London. A voyage down the river became a popular diversion, and even in those days the number of passengers carried every year exceeded a million.

At present the pleasure service is maintained by the three famous "Eagles"—Royal Eagle, Crested Eagle, and Golden Eagle. Of the last-named, something has already been said. Her daily run in the summer is to Margate and Ramsgate. The Crested Eagle, built in 1925, is an oil-burning steamer, and was, indeed, the first oil-fired paddle steamer in the United Kingdom. She plies to Clacton-on-Sea. Finally, there is the Royal Eagle, built at Birkenhead in 1932, which is the last word in river steamers, and in her two seasons of service has gained great popularity among the travelling public. Oil-burning throughout, she is fast and roomy.

Like other shipping companies, the "General Steam" has been affected by adverse world conditions. But it has pursued a conservative policy and rationalised its services to extract therefrom the greatest working economy, and so it has not been deluded into a false sense of values. Though old in years, it has lost none of its vigour. It is still, as in the past, the main carrier of goods between London and the Continent of Europe. It has branches in Continental ports and a network of agencies throughout the Continent. In London it handles tens of thousands of tons more than any other shipping company.

The present Chairman is Mr. W. J. McAlister, who last year was elected President of the Chamber of Shipping of the United Kingdom. Mr. McAlister joined the company in 1914. His fellow-directors are Messrs. Stanley Sparkes and Robert Kelso. The Secretary is Mr. Willoughby K. John, who has held this position since 1910; his connection with the company goes back for nearly half a century. With him is associated Mr. E. N. Griffith, as Assistant Secretary. The Marine Superintendent is Captain H. O. Spearpoint and the Superintendent Engineer is Mr. A. J. Mansfield.

"London River.'

CHAPTER XIII.

The Port of Liverpool.

Early in the thirteenth century, King John commandeered the little fishing haven on the Lancashire side of the Mersey estuary and dispatched therefrom troops to Ireland. The accommodation afforded by the harbour must have answered his purpose, for in 1207 he granted the town, or rather the hamlet, a charter as a self-governing borough. In spite, however, of this mark of royal patronage, Liverpool cut a sorry figure among the west coast ports during the next four centuries, and in fact remained under the jurisdiction of Chester until 1647. The harbour proper, which at that date and considerably later was approached through a maze of sandbanks, was a small tidal pool, the expansion of a creek known as the Liver or Laver pool. It was here that in 1709–15 the first of the port's enclosed docks was built. It was quite a modest effort at dock engineering, costing with its enclosing walls and entrance lock £15,000, but though its water area was only four acres it sufficed to accommodate 100 ships of that period. Further progress was slow, and in 1800 Liverpool could boast only 25 acres of docks.

The opening of the first dock was coincident with the port's entry into the slave trade, the first vessel to engage in it being a diminutive craft of 30 tons burden. Later the traffic developed very rapidly, and in 1751 over 50 ships left the Mersey for West Africa, where they loaded slaves for the West Indies, returning home with full ladings of sugar and rum. In 1765 the slavers had increased to 86, and before the abolition of slavery in 1807 it is recorded that Liverpool had 185 ships on the West African-American run, with carryings of over 50,000 in a single year.

Another phase of activity which developed concurrently with slaving was privateering. The main purpose of the first letters of marque fitted out by the merchants was that of protecting their commerce from the depredations of French raiders, which preyed upon the shipping trade of the port to such an extent that insurance rates were almost prohibitive. The success of these ships was such that privateering, apart from its appeal to local patriotism, came to be regarded as an attractive financial venture, and during the American Revolution 120 privateers, many of them specially built for their mission, were based on Liverpool.

During the Napoleonic Wars the overseas trade of the port suffered heavily, but with their conclusion a steady improvement set in which received impetus from the advent of the steamship, the inauguration of a regular steam passenger service between

England and America by the Cunard Line, the rapid advance of manufacturing industry in the North and the Midlands, and the vitalising of the national import and export trade by the intensive development of our coal and iron industries. Under these favourable conditions new docks were constructed to meet the increasing requirements of shipping, so that in 1858, when the control of the port passed from the municipality to the Mersey Docks and Harbour Board, there were in all 34 with a total water area of 192 acres. To-day, including those on the Birkenhead side of the river, there are 89, with an area of over 657 acres. Before the régime of the Board, there were no dock railways, but now there are 112 miles, while the Authority's warehouse accommodation, which had a capacity of 1,200 tons when they took over the docks, is 500,000 tons. Formerly the navigable channel through the Mersey Bar was negotiable by the largest ships only for a limited period each tide, but at present the least depth is 27 ft. at low water of any tide.

Constitution of Docks Board.

The Mersey Docks and Harbour Board has now been in existence for three-quarters of a century. Before it was established the Corporation of Liverpool were the Authority. Their administration, however, did not appeal to the shipowners and merchants, nor to many Lancashire manufacturers, mainly on the ground that the dues levied on goods were not exclusively used for developing the port, but were in part expended on the town. The agitation for reform was so insistent that a Royal Commission was appointed in 1853 to investigate the matter, and four years later an Act was passed creating the Docks Board and stipulating that the Corporation should receive £1,500,000 as compensation for their surrendered rights.

The constitution of the Board has remained as framed in 1858, and, in spite of the growth of the port and the revolutionary changes in its shipping and trade, admirably meets the requirements of to-day. There are 28 members, who receive no remuneration for their services. Four of them are appointed by the Ministry of Transport, one of these retiring each year. The others, of whom six retire each year, are elected for four years; they must be residents of Liverpool or domiciled within 50 miles, and have paid during the year preceding their candidature £25 in rates on ships or goods. When more candidates are nominated than there are vacancies, a poll is taken not less than seven days after nomination. The electors, who cannot vote by proxy, are those enrolled as payers to the Board of £10 or upwards in rates or dues, and if aliens they must be resident in the United Kingdom and their names must be on the Dock Electors' List. Contested elections are unusual, as the elected members of the Board generally include 12 representatives of the steamship interests and two each of the Cotton and Corn Trade Associations, while organisations having one member are those identified with the sugar, meat, provisions, wool, timber, fruit and general produce interests. As each of these bodies selects its own members for nomination, recourse to a poll implies that there is a divergence

THE LANDING-STAGE AT LIVERPOOL.
(By courtesy of the Mersey Docks and Harbour Board.)

of opinion among the members of one or other of the trade associations, that an unrepresented organisation is desirous of having a member on the Board, or that a represented trade group seeks to increase its membership.

The Chairman, who like the other members is unpaid, is elected each year, and at the end of his term of office may be re-elected. Thus Mr. Thos. Dyson Hornby occupied the Chair 1876–1889, Mr. Alfred Holt 1889–90, Mr. John Brancker 1890–99, Mr. Robert Gladstone 1899–1911, Sir Helenus Robertson 1911–19, and Mr. Thomas Rome 1919–27. The present Chairman, Mr. R. D. Holt, was elected in 1927 but retired in 1929, when Mr. Arthur W. Bibby succeeded him. Mr. Holt was re-elected in 1931. The operations of the Board are controlled by nine Standing Committees—Works, Traffic, Marine, Finance, Docks and Quays, Warehouse, Pilotage, Staff, and Parliamentary. The chief officials are the General Manager, Engineer-in-Chief, Solicitor, Treasurer, Accountant, Marine Surveyor, Harbour Master, Warehouse Manager, Traffic Manager, Superintendent of Pilots, and the Traffic Agents in charge of the Board's Offices in London, Birmingham, and Bradford. Liaison between the Committees and the various departments concerned is maintained by Committee Clerks, and resolutions agreed by the Committees are submitted to the full Board, which sits in open session weekly, and when approved or modified are passed on to the departments interested through the General Manager. The Pilotage Committee differs from the others in that it includes six outside members, four of whom are pilots nominated by their fellows and vested with the right of attending meetings and voting upon any question which may be under discussion, an arrangement which makes for the smooth running and efficiency of the service.

The principle of representation upon the Board and the Committee system of control have both stood the test of time and are generally recognised as providing a form of government under which the users of the port, who provide its revenues, may determine the lines of development and equipment best calculated to meet the requirements of shipping and commerce.

Financial Position.

When the Mersey Docks and Harbour Board took over the control of the port from the Trustees appointed by the Liverpool Corporation, it was arranged, as already stated, that the latter should receive £1,500,000 in consideration for Town and Anchorage Dues. This sum was raised under the Mersey Docks and Harbour Act, 1857. Since then various Acts of Parliament have sanctioned borrowings which bring the total authorisations up to £48,061,974. On July 1, 1932, the sum expended was £44,183,558, leaving an unexpended balance of £3,878,416. The sinking fund, which is fixed by Parliament at £100,000 per annum, or such less amount as the surplus revenue shall be equal to, and which must be applied to extinguishing borrowing powers, then amounted to £6,557,500, and this together with sundry balances of over half a million reduced the indebtedness

of the Board to £37,110,047. The accompanying table shows how thus sum is made up. The bonds are issued against the security of income derived from rates and dues on shipping and goods and bear interest at rates varying from 3 to 5¼ per cent. About £14,000,000 of this capital was raised at 5 per cent., £2,250,000 at 5¼, £4,500,000 at 4¾, over £2,000,000 at 4⅝, and nearly £900,000 at 4½ per cent. The highest rate paid on the annuities is 3¾ per cent. and the lowest 2¾, the sums invested at these rates being respectively £700,000 and £156,000. In 1933 £800,000 of debenture stock bearing interest at 3½ per cent. was offered to bond holders and was completely subscribed.

Bonds	£25,628,285
Consideration for Mersey Dock Annuities	2,397,566
3 per cent. Debenture Stock (1900)	84,196
3½ per cent. Debenture Stock (1905)	8,500,000
Promissory Notes	500,000
Total	£37,110,047

The Riddle of the Sands.

One of the most important duties of the Board is the maintenance of an adequate channel through the maze of sandbanks which lies between the lower estuary of the river and open water. These are the combined contributions of the Mersey, Ribble, Dee and other smaller streams, the first named being by no means the principal offender. In the past, when Nature was left to her own devices, old channels would become silted up and others would deepen in disconcerting fashion, thus adding to the navigational difficulties of Liverpool Bay. To-day the tendency to change is combated by the development of one main passage, and by utilising the forces of Nature to concentrate the scouring effect of the ebb tides so as to secure the most effective dispersal of riverine detritus and silt.

The main obstruction to easy access to the port is the famous Bar, which at a distance of 13 miles from the Landing Stage interposes a shallow patch over 1½ miles in length across the fairway. It was not until 1890 that the dredging of a cut through this obstacle was attempted. The vessels employed were dredgers of 500 tons, fitted with centrifugal sand pumps. These craft soon demonstrated that the problem was not insuperable, and they were replaced by larger vessels, one of which, a twin-screw with a speed of 10 knots when loaded and drawing 23 ft., was capable of pumping 10,000 tons of sand into its hoppers from a depth of 70 ft. in 50 minutes. The cut through the Bar is 2,000 ft. wide, and since operations were begun, 120,000,000 tons of sand have been removed, together with 380,000,000 tons from the connecting Queen's and Crosby Channels. These large quantities are exclusive of dredgings from the docks and their approaches, the oil jetties, and the vicinity of the Landing Stage, where a minimum depth of 35 ft. at low water of any tide is maintained. In 1890 the depth on the Bar was 11 ft. at low water.

To-day it is 27 ft. at low tide of springs or only 3 ft. less than the Board's objective of 30 ft.

During recent years Liverpool has sought a solution of its riddle of the sands from another angle, and with such success that the annual expenditure upon dredging has already been considerably reduced. Under this plan, which was initiated in 1909 and is generally described as the revetment scheme, dumpings of limestone have been deposited so as to form submerged walls outside the fairway and above low-water mark for the concentration and guidance of the tidal ebb, which at the bottleneck outlet of the estuary proper may attain a maximum speed of four knots. By these operations erosion has been checked, sharp corners have been rounded off, thus straightening the main channel, the banks have been given a more permanent contour, and the deep water passage into the port has been stabilised. The term training walls, however is in some respects a misnomer. There is no attempt at architectural construction, the cargoes of limestone, brought from North Wales, being simply dropped from the hoppers of the carrying craft on to the sea-bed. The calcareous nature of the dumps ensures a certain amount of cementation, but the main binding forces of the so-called walls are the seaweed and shell fish which find a congenial habitat in these rubble heaps of small hard stones. The original revetment, as completed towards the end of 1910, was 2½ miles in length. Since then it has been considerably extended seawards, and at present the total length of revetments completed or under construction is over nine nautical miles.

The pilotage area administered by the Docks Board includes all channels enclosed by imaginary lines drawn from the Manchester Ship Canal entrance at Eastham to the Lancashire side of the Mersey, and seawards from a point on the north coast of Anglesea to the Calf of Man, and from the Point of Ayre in the Isle of Man to St. Bees Head, Cumberland. Ships approaching Liverpool from the southward must take their pilot at Point Lynas, Anglesea, but foreign shipmasters sometimes ignore this regulation and pick up the pilot at the Bar in the hope of reducing their pilotage dues, an evasion however, which renders the delinquent liable to severe penalties, and is very rarely successful. Formerly the pilotage service was maintained by a fleet of 12 sailing cutters, but is now worked by four steam pilot boats, with a smaller craft for river work. The main channels leading to and from Liverpool are surveyed monthly by the Board's marine surveyor and water bailiff, such supervision ensuring the accurate determination of silting and the proper functioning of the navigational aids. The latter include three lighthouses, three lightships, and 104 buoys and boat beacons. The Bar Lightship, in addition to its group of flashlights 30 ft. above the water, with a visibility of 10 miles, is equipped with fog signal, wireless telephony, and radio fog warning. The passage through the Queen's and Crosby Channels to the Gladstone Dock entrance is defined by 24 flashing red lights on the port side, and the same number of white on the starboard, the buoys and beacons from which they are exhibited differing in form and colour. In addition

there are the navigational aids of the Formby and Crosby Lightships, which further assist in making the lane of approach as easily negotiable by night as day. Meteorological and tidal data are collated by the Bidston Observatory, an institution administered jointly by the Docks Board and the Liverpool University.

The Port of To-Day.

A former Chairman of the Mersey Docks and Harbour Board once aptly remarked that the question which ever faced the Port of Liverpool was how to make a silk purse out of a sow's ear. What he had in mind was the inherent difficulty of adapting an old-established port, whose dock system had been built up during the sailing ship era, so as to keep pace with the increasing size of steamers during the progressive 80's and 90's of last century. The problem, however, was tackled, as it had been on previous occasions when the enterprise of the shipowner threatened to outstrip the facilities of the port, and with such success that the 21,000 tons Celtic and 24,000 tons Baltic were included in Liverpool's fleets in 1901 and 1904, and in 1907 the 30,000 tons Lusitania and Mauretania could berth alongside the Landing Stage at any state of the tide. The older docks were built of granite, the Board having its own quarries on the north side of the Solway Firth, and when alterations or extensions were necessary it used to be said that the constructors had built not for time but for eternity. In the modern docks, however, the picturesque granite is replaced by the more utilitarian ferro-concrete.

On the Liverpool side of the river the dock system stretches for a length of seven miles, with the Landing Stage fronting the central portion. A continuous roadway for heavy vehicular traffic extends along the whole line of docks, and side by side with it is the main dock railway, which is connected with the depots of the principal lines, numerous branches linking it with the quays and warehouses, while the Overhead Railway provides speedy passenger transport between dock and dock. The evolution of the silk purse has been a very gradual process, and though shipping developments will no doubt require still further facilities in the future, the Board may rest from its labours for some years to come, having completed the Gladstone system in 1927, and since then improved and deepened the Birkenhead docks and added to them a new one, the Bidston, of 10·3 acres, which can be extended to twice its size when occasion requires. It has also modernised the central section of the Liverpool system, with the object of increasing the accommodation for the coastwise trade and bringing the equipment of the docks into line with the latest practice.

The outstanding work of recent years is the Gladstone group of docks, the most northerly or seaward in the port. The requisite powers for its construction were granted by Parliament in 1906, and fortunately one self-contained section was available for use at the outbreak of War and proved itself a national asset of the utmost value. The dock could be used either as a wet or a graving dock, and during the struggle was in great demand for drydocking and

repairing war vessels of the largest type and for reconditioning big liners. In the scheme as completed, however, the dock is used solely for repair work. The inception of the Gladstone dock system was practically coincident with the decision of the Cunard Steamship Company to build a vessel considerably larger than the big liners in commission. This was the Aquitania, with a length of nearly 900 ft. and a gross tonnage of 46,000. As there was no drydock accommodation in the United Kingdom for such a leviathan, the Docks Board decided to concentrate upon the graving dock so that it might be ready upon her completion. The work, which included a separate entrance from the river, was prosecuted with all dispatch, and the dock was opened by the King in July 1913, the year preceding the advent of the Aquitania. Fourteen years later His Majesty performed the opening ceremony for the whole system, of which the graving dock, the river entrance to which had been closed, formed an integral part. The site occupied by the docks, quays, warehouses, rail connections, and roadways has an area of 213 acres, the water portion including a vestibule or entrance dock in which the largest ships may turn, two branch docks, the graving dock in which a ship is kept in position by hydraulically worked bilge blocks, thus avoiding the necessity of shoring, and a passage from the estuary.

This entrance is the most striking feature of the whole plan. Mersey tides have a range of over 30 ft., and formerly docking and undocking operations had to be carried out in the two hours preceding or following high water. The Gladstone entrance extends this period, and so effects a valuable time economy, for the lock is so deep that vessels drawing 27 ft. can enter or leave the system at any state of any tide. Its length is 1,070 ft. and the width 130 ft., and the quays of the docks to which it leads can berth nine ships of the largest class. There is a generous provision of quay cranes, and the warehouses alongside include four of three storeys varying in length from 1,200 to 1,500 ft. and in width from 100 to 150 ft. On their flat roofs, which can be used for storage, powerful batteries of moveable electrical cranes are installed which can serve ship, road, rail, or warehouse. The internal equipment embraces all the latest time and labour saving devices, the object of the Board being not only to provide accommodation for the largest vessels, but also to insure them the quickest possible turn-round. The cost of this unique group of docks was £7,750,000, and of this sum nearly one-third was absorbed by sheds and warehouses and their equipment.

Another noteworthy feature of the port is its Landing Stage. The first structure was built in 1847, and superseded ten years later by one with a length of 1,000 ft. This was reconstructed under powers granted by Act of Parliament in 1871, and when awaiting the formal opening in 1874 was destroyed by fire. The present floating platform, which is half a mile in length, is supported by some 200 pontoons each about 80 ft. long with a width of 10 ft. and a depth of 6 ft. The bridges connecting the stage with the shore are 110 ft. in length, while a floating structure of 550 ft. is provided for vehicular traffic. The Mersey ferries use the southern portion of the stage, while the northern section, at which a low-water depth

of 40 ft. is maintained, is reserved for the transatlantic and other ocean passenger services and the Irish, Isle of Man, and North Wales traffic. The Customs examining rooms are on the stage itself, and adjoining them is the Riverside Station to and from which special trains are run as required in connection with the arrival and departure of liners.

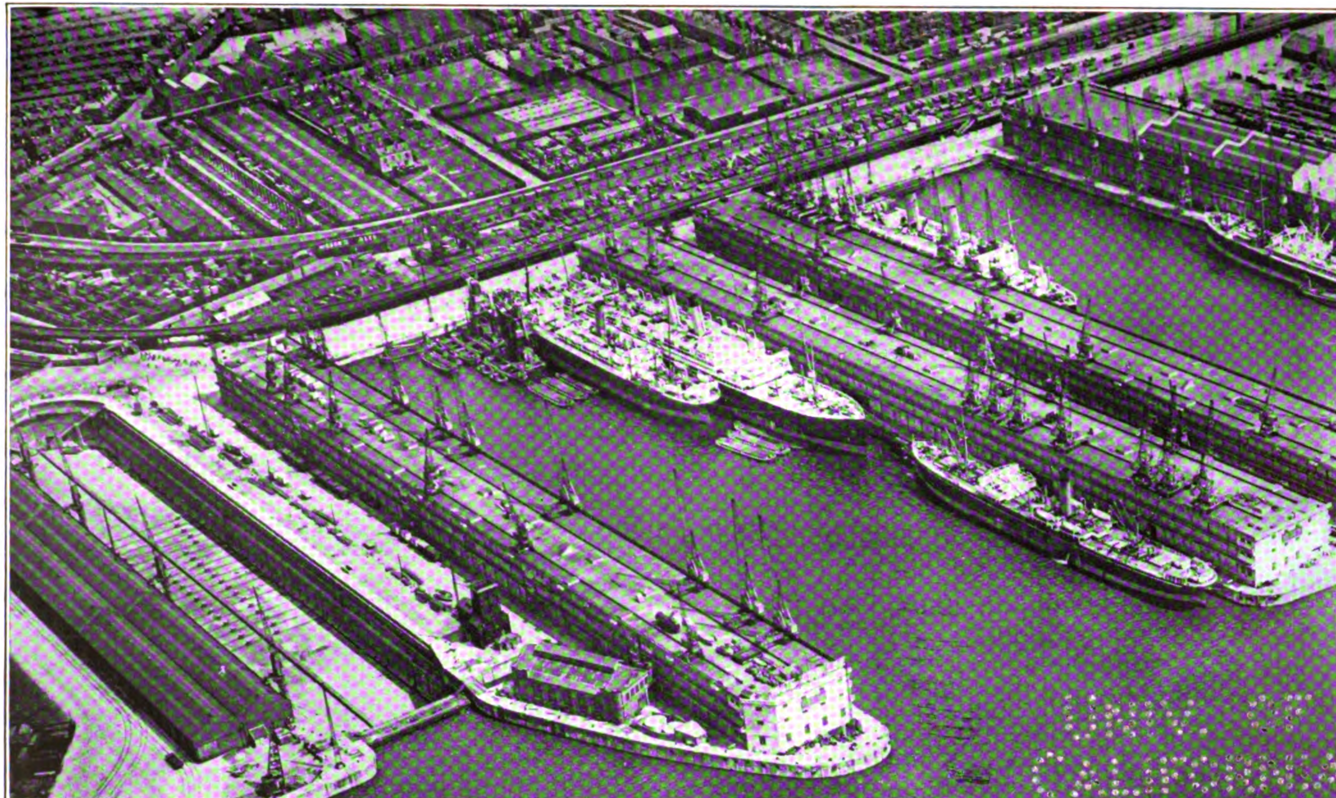
The cattle trade of the port is dealt with at the Mersey Cattle Wharves, Birkenhead. Lairage accommodation is provided for 6,800 oxen and 22,000 sheep, the daily slaughtering capacity being 3,000 cattle and 7,000 sheep. During 1932 the livestock landed comprised 255,763 oxen, 322,413 sheep, and 44,800 pigs.

Oil cargoes are handled at the southern extremity of the Liverpool dock estate, where two special jetties have been built, one for tankers and the other for barge traffic. The Board's petroleum tanks have a capacity of 12,500 tons and those of various companies 140,000 tons, while at Birkenhead storage is provided for over 50,000 tons.

The warehousing accommodation included in the Board's estate is very extensive. The principal commodities stored are grain, tobacco, sugar, cocoa, wool, and wines and spirits. The Stanley Dock Warehouse, which is used principally for the storage of tobacco, is said to be the largest in the world. The building measures 725 ft. by 165 ft., with a height above the quay of 125 ft. Its twelve storeys have a total floor space of 36 acres, and its storage capacity is 75,000 casks of 500 lb. Other warehouses at the same dock can take 42,500 casks. Large stocks are also stored at other docks, and there have been occasions when the total tobacco warehoused has exceeded 185,000 casks. Extensive provision is also made for grain, the Mersey port being the second largest milling port in the world. The silos of the Liverpool Grain Storage Company at the Alexandra Dock can take 110,000 tons, and those at the Coburg Dock 60,000 tons, while the Liverpool grain warehouses of the Docks Board have a capacity of 30,000 tons, and those at Birkenhead 31,000 tons. Much storage space is also required for the seed, oil, and cake trade, the yearly imports of linseed, cotton, seed palm kernels, ground nuts, etc., totalling about 800,000 tons. The East India Wool Warehouse has storage for 160,000 bales, but as it is the practice for the wool to be placed on show for public auction, the actual working capacity is reduced to about 90,000 bales. Other commodities which make a big demand upon the warehousing facilities of the port are sugar and cotton, the annual imports of which are about 700,000 tons and 1,500,000 bales.

The Present and the Future.

The Port of Liverpool has felt the world depression very acutely, though not perhaps in the same degree as some other ports. Its import trade, however, has been fairly well maintained. In 1929 the commodities landed from abroad, exclusive of bulk petroleum and cattle, aggregated over 7,250,000 tons. There was a drop in the following year to 6,391,000 tons, succeeded by a recovery to



THE GLADSTONE DOCK, LIVERPOOL.

(By courtesy of the Mersey Docks and Harbour Board.)

6,426,000 tons in 1931 and to 6,494,000 tons during the year ended with December 1932. Liverpool, therefore, enjoyed an increase of 1 per cent. in this section of its trade, and that at a time when foreign cargoes landed at United Kingdom ports dropped from 55,200,000 tons to 52,300,000 tons, or 5·3 per cent. With regard to the export trade, the returns of the port reflect the general decline in industry and the shrinkage of the demand for British goods in most foreign markets. Exact figures are difficult of ascertainment, but as 12,300,000 tons of cargo were handled at the Board's docks during 1932–33, of which more than half consisted of foreign imports, while the balance included both coastwise commerce and foreign exports, it is obvious that the latter must have been seriously restricted. In fact it is a conservative estimate that the foreign trade of the Mersey port has declined by quite 25 per cent. since 1929.

The accompanying table shows how the depression in the shipping industry has affected the volume of tonnage using the port, and the Board's revenue from vessels and goods. The income from the former does not include receipts on conservancy account, which were £237,202 for the year ended July 1, 1933. If this sum were added to the total given in the table, the income from ships and goods for 1933 would be increased to £2,314,142.

Year ended July 1.	Tonnage paying Dock or Harbour Dues.	Rates from Docks, Dry Docks, and Dock Rents.	Rates and Dues on Goods.	Total.
		£	£	£
1913 . . .	18,433,269	765,657	812,947	1,578,604
1929 . . .	20,521,906	1,377,266	1,221,198	2,598,464
1930 . . .	21,314,820	1,398,984	1,124,233	2,523,217
1931 . . .	19,843,228	1,256,542	956,233	2,212,775
1932 . . .	19,080,728	1,211,743	984,497	2,196,240
1933 . . .	18,758,839	1,166,930	910,010	2,076,940

In the year 1933 the dock tonnage dues in the table were derived from 14,177,343 tons, the balance of the shipping entered at the port paying harbour rates only. In 1913 the contributing vessels totalled 14,523,717 tons, or 346,374 tons more, though the dock tonnage rates were only £765,657, against £1,166,930 in 1933. Thus while the tonnage using the docks has slightly decreased, the charges on ships have increased by 52 per cent.

The question of these augmented costs has been the subject of frequent protest by the Liverpool Steamship Owners' Association, which holds a watching brief in the interests of the shipping companies in both general and domestic matters. The case for the shipowners is strong. They urge that they have practised every possible economy in order to keep their ships in commission, and that in such circumstances it is incumbent upon the Authority to reduce its charges. The position of the Board, however is difficult. As already shown, it has been faced with a declining revenue during the depression, and, in effect, its reply is that it also has

adopted a policy of the most rigorous economy consistent with efficiency, and has endeavoured to hold the scales impartially between ships and goods, but at present further lowering of charges is impossible.

Since the outbreak of the War rates and dues have been increased as from January, 1917, November, 1917, May, 1918, and December, 1920. In 1922 an all-round decrease was made in the dock tonnage rates on ships and goods, but in September, 1928, it was found necessary to discontinue the reduction of 5 per cent. in the foreign dock tonnage rate, though subsequently as from January, 1930, it was restored and reductions in the dues on certain commodities were also made. From April, 1929, all goods exported coastwise were exempted from payment of outward town dues, while more recently concessions have been made in regard to cruising vessels and laying-up charges. Beyond these limits the Board has decided it cannot go until such time as trade improves. In arriving at this conclusion it has been guided by the teachings of past experience that reduction of rates affords no guarantee that sufficient new business will be attracted to make good the loss of revenue incurred.

During the slump which followed the ephemeral boom of the immediate post-War period, and especially during the decline since 1929, the various shipping services centred on Liverpool have not suffered equally. The port handles about 30 per cent. of the overseas passenger traffic of the United Kingdom, though the emigrant traffic to Canada and the United States has almost disappeared and does not appear likely ever to attain anything approaching its former dimensions. Higher rated passenger business has also shrunk, not only in the North Atlantic trade, but also on the other ocean routes. There is an all-round decrease, too, in the volume of exports offering for shipment. A trade which has been badly hit by the economic blizzard is the West African. The Continental competition for the produce of tropical Africa is very keen, and the smaller imports into this country have been further reduced by the use of whale oil in the soap and margarine industries. These adverse factors have contributed to restrict the activities of Messrs. Elder Dempster, which are mainly based on Liverpool.

As might be expected, too, the keen competition in the world's cotton markets is reflected both in the reduced imports of raw cotton and in the exports of manufactures. In 1913 the former totalled 16,906,000 centals, but in 1931 they were only 7,437,000 centals, though still about three-fourths of the aggregate imports. With regard to cotton exports, these were valued at over £71,000,000 in 1913, and £26,000,000 in 1931. In the latter year Liverpool's share of the total export trade of the United Kingdom was 26·9 per cent. and London's 22·8, the respective values being £105,200,000 and £89,000,000. In spite of the reduction in overseas trade, Liverpool has held its position as the second *entrepôt* for raw materials and foodstuffs and the chief exporting centre of the United Kingdom.

RICHARD BEYNON.

CHAPTER XIV.

Welding in Ship Construction.

Two welding techniques may be regarded as deserving of notice in connection with ship constructional work—welding by the oxy-acetylene process, and welding by the use of the metallic arc. Both of these have been recognised as of value, albeit somewhat tentatively, in rules and regulations issued by at least one important shipbuilding country. The Registro Italiano Navale ed Aeronautico issued rules in 1933 accepting both types of welding, under strict safeguards.

Welding by the oxy-acetylene process has not yet attracted sufficient attention among ship designing and shipbuilding interests to claim much space in the present survey. For a great deal of work it is less flexible than electric welding, while its practical operation involves the planning of work with far greater care, in order to avoid or minimise stresses arising from heat effects. At the same time it must be noted that important arguments can be advanced in favour of oxy-acetylene welding for certain classes of work, using methods of working and blowpipes developed during the past year or so. The writer is of the opinion that persistent research with this method of welding will eventually result in a much wider appreciation of its possibilities than is to be seen at the moment. Certainly, the overcoming of difficulties arising from heat effects, or the strict limitation of the application of the process to tasks in which heat effects will not be detrimental to the soundness of the completed job, would permit oxy-acetylene welding to offer advantages in some cases, as regards both speed of welding and economy in the cost of preparation.

Further experiments indicate that, if properly carried out, oxy-acetylene welds can be relied upon to be fully equivalent to welds made by the use of the metallic arc. This is a point of importance. In the past, experience of poor gas-welding workmanship tended to throw doubt upon the adequacy of oxy-acetylene welding for work of primary importance, but, just as there has been great improvement in electric arc welding technique of recent years, so, too, there have been developments of like importance in oxy-acetylene welding. Justification for this statement is to be found in the fact that on the Continent a considerable amount of oxy-acetylene welding work is accepted for boiler shells and the shells of other pressure vessels.

However, electric arc welding using metal electrodes has progressed very much farther in favour for ship constructional work than has oxy-acetylene welding, and in what follows the welding discussed will be of this type.

Electric Arc Process.

Despite the length of time which has elapsed since electric welding was first discovered to be a sound practical method of making a joint between two pieces of steel, progress in its application to ship construction has been exceedingly slow, so slow, in fact, that development in this direction must be regarded as being still in its infancy. Ship designers are still wrestling with difficulties of a fundamental character, upon the sound technical and commercially economical solutions of which depend future progress towards the ideal aimed at—the all-welded ship.

In other branches of engineering electric welding has gained a firm place as a reliable tool. Practical men have found it possible to create excellent impromptu engineering structures "in the field" by its use, while designers have been able accurately to predetermine constructional requirements since they have been able to rely upon the consistent nature of the joints produced by good electric welders using electrodes of acknowledged repute. Abroad, and lately in this country, electric welding has been used for the production of high-pressure steam boiler drums, than which there could hardly be any more onerous or responsible service. In such examples of work, however, the fact must not be overlooked that it is the invariable practice to anneal the completed welds, a course of treatment which it is not practicable to apply to the long and heavy welds required in a ship's hull. This is a point which is not always given the attention it deserves.

In the extension of electric welding to the construction of the strength hulls of ships, progress has been neither rapid nor consistent, important differences of opinion and practice existing between experts in this country, and also between our experts and those of other maritime nations. There is great need for a detailed survey of the position from both the practical and the theoretical aspects, with a view to the creation of a single standard of requirement based upon recognised and agreed ideals which shall be commonly accepted by ship-designing and ship-building experts all over the world. This may sound a startling and somewhat belated suggestion, but justification for it is not lacking, as will appear in due course.

There is no way of subjecting the hull of a ship to overload testing stresses as is a common practice in other branches of engineering. The forces which a ship is called upon to survive in a storm are not calculable. Even if they were, there is no way of imposing those forces on the ship other than by sending her through stress of weather such as will provide abnormal wave conditions. It is these facts which make it a matter of considerable moment that in the application of electric welding to ship construction no considerable step should be taken, in this country or abroad, which is not thoroughly acceptable to the designers and builders of ships, generally, all over the world. It would be regrettable in the extreme should any untoward fate overtake a vessel which had been constructed by electric welding throughout, since it would inevitably set back the development of electric welding for this important service.

Technical Position.

Regulations determining the extent to which electric welding may be employed for ship construction have now been issued by Classification Societies in most of the principal shipbuilding countries, including Germanischer Lloyd, Registro Italiano Navale ed Aeronautico, Lloyd's Register, and the British Corporation. Bureau Veritas have confined approval to vessels to be used for inland navigation, while Norske Veritas have refrained from issuing formal regulations at the present stage of development. In America an extensive series of observations and regulations has been issued by the Navy Department Bureau of Construction and Repair, and it is believed that American merchant shipping practice is inclined to accept the ideas on which the American naval authorities have been creating their own technique, although these ideas are based very largely on the use of bare wire or lightly coated electrodes.

Of these various authorities Lloyd's Register and the British Corporation have determined standards of test performance, for electrodes to be used for main structural work, which practically prohibit the use of bare wire or lightly coated electrodes. The British Admiralty have published no regulations in regard to the use of electric welding for strength purposes, but from a paper on "Electric Welding in Warship Construction" communicated to the Institution of Naval Architects by Mr. C. S. Lillicrap, R.C.N.C., at the 1933 Spring Meetings, it is evident that only electrodes giving a high standard of test performance will be accepted by the Admiralty for structural work of importance. The Admiralty standard in this respect is fully as strict as that of the British Registration Societies. Opinion among the authorities in other countries, however, is far from uniform as to the need for so high a standard of requirement.

Before discussing this particular matter, brief reference may be made to the manner in which electric welding for ship construction has developed during the past sixteen years or so, since it was first regarded as a promising technique by British authorities who used it for constructing war-time craft, and also, shortly after the War, the famous Fullagar. The building of that vessel marked practically a full stop in the application of electric welding to ship hull construction in this country, and it would seem that resuscitation of the idea of building all-welded ships actually resulted from the pressure put upon naval constructors to lighten the construction of warships following international agreements limiting the tonnage of these vessels.

German and American Practice.

However that may be, plenty of evidence is now available to establish the fact that both Germany and America began to press forward very earnestly with the application of electric welding to ship construction some three or four years ago, although practically the whole of the electric welding which they have done since this revival of interest has been done with bare wire or lightly covered

electrodes. This is a point of extraordinary importance, on which a fundamental difference of opinion seems to exist between our own and foreign experts. Bare wire or lightly covered electrodes have not yet been manufactured which will reproduce in the deposited weld metal the ductility characteristics which are present in normal shipbuilding steel. Yet, despite this lack of an important physical quality, some German and American experts persist in averring that practical results achieved with bare wire and lightly coated electrodes are fully up to the needs of the case, the Germans in particular being very firm on this point, although authoritative statements have appeared to the effect that the whole of the German experience with electric welding for ship work has not been entirely satisfactory.

To afford practical confirmation of their attitude, the Germans point to a considerable amount of electric welding done on warships, to the results of explosive and other tests on specimen jobs created for naval research and experiment, and to the results of certain full-scale experimental work done in order to test out the comparative virtues of riveted and electrically welded joints.

The Germans cite the following among other important ship constructional work carried out with bare wire or lightly coated electrodes. In a paper written by Obermarinebaurat Burkhardt of Berlin in 1932, it is stated that in work done before 1931 all the joints of the longitudinal framing were butt welded in the Leipzig, the Deutschland, and several smaller gunnery and fishing patrol vessels, and that the internal bulkheads in those vessels were connected to adjacent structural parts by welding. It is also claimed that the Ersatz Lothringen, built in 1931, is all-welded with the exception of the longitudinal seams in the shell plates, these being riveted, it is stated, on account of the difficulty of welding, after erection, in such a manner as would avoid contractional stresses, and not on account of any doubt being felt as to the strength and efficiency of such longitudinal welded joints under stress.

The Americans point to numbers of all-welded special craft, barges, yard craft, garbage boats, small tugs, oil tankers, and so on, some constructed for the American Navy and some for commercial interests, but mostly all by workmen using bare wire or lightly coated electrodes.

More specifically, American achievements in electrically welded ship construction include the Carolinian and Lucy, two ship-shaped oil tankers of 120 ft. and 148 ft. length respectively, both built on the Loknochweld system, a special form of construction in which the stiffening members are interlocked in order to relieve the welded joints of strain in service; several large open-topped barges up to 200 ft. or so in length, with their sides and bottoms constructed of large channels running fore and aft, some with the flanges all directed inwards and some with alternate channels facing one inwards and one outwards, both ingenious types of construction but of limited practical value; a few small vessels built on the truss-weld system which is entirely unsuitable for normal ship practice; and a considerable number of small naval craft including as already mentioned

two tugs, a seaplane lighter, garbage vessels, barges, and so on, of ship-shape forms, but not exceeding 150 ft. in length. In large warship work, of course, a great deal of electrically welded construction has been done internally.

So far as America is concerned it must be admitted that the picture is rather confusing, as American concerns have experimented with so many different forms of welding technique that it is difficult to draw a clear line as to the results which they have obtained. As an outcome of an important series of experiments carried out under the care of the Navy Bureau of Construction and Repair, it appears that they are inclined, recently, to come round to the view that there may be definite need for a high standard of ductility in the deposited metal when this is to be used for longitudinal shell seams, but not otherwise.

Most of the data to which reference is made in the foregoing paragraphs were published in this country after the reading of a paper on "Electric Arc Welding in Ship Construction" which was contributed to the Institution of Naval Architects in March, 1932, by Mr. Foster King and Dr. Montgomerie, representing the British Corporation and Lloyd's Register respectively. It is well known that as long ago as 1918 Lloyd's Register took a pioneering step by issuing the first set of instructions governing the application of welding to ship construction. Those instructions, however, carried an important reserve in the requirement that vessels so constructed should carry the word "experimental" in the Register, a reservation which had a far-reaching commercial reaction, and progress following publication of those instructions was practically negligible for many years. It is not unlikely that the vigour with which German and American interests were known to be moving in the development of electric welding in 1930 and 1931 assisted in determining the production of a first set of electric welding regulations by the British Corporation, and the issue of a revised set of instructions by Lloyd's Register, which events took place at about the same period as saw the reading of the joint paper just mentioned.

Character of Electrodes.

Substantial agreement existed between the Rules issued by the British Corporation and Lloyd's Register in 1932—why not precise agreement it is difficult to understand—and those interested in electric welding *qua* welding looked forward to an era of greatly increased activity in this country. As already stated, the regulations of these two Classification Societies were quite definite in calling for qualities, from weld metal deposited from electrodes submitted for their formal approval for hull work, which cannot yet be anticipated from electrodes which are of bare wire or but lightly coated.

Are electrodes giving these high-grade tests essential for work of structural importance? That is the question which is being brought to the front by the persistent advocacy of German experts. It is a vitally important question from both the technical and the commercial points of view. The Germans appear to hold the view that

all-welded vessels fully equivalent to riveted ships can be constructed by using electrodes which are of bare wire or but lightly coated, and which deposit weld metal of a high standard of strength but of low ductility above the limit of proportionality. The British experts, and it is believed the Italians, are not inclined to take this view. The Americans apparently have not yet set really definite standards, but they seem lately to be inclining towards the British idea for a certain range of structural work.

Commercially, there is much to be said in favour of lightly coated electrodes with regard both to the initial cost of the electrode and to ease of application, especially when multiple runs have to be made. It is not impossible that the commercial success of the all-welded ship may eventually prove to be dependent upon the use of lightly coated electrodes, but it is extremely difficult to offer any opinion on this point at the moment, particularly as so many other questions still remain unsolved. The point is one to be studied very seriously.

Preparation of Work by Flame-Cutting.

A matter of more intimate importance, and one upon which considerable controversy has been waging among experts in our own country, is wrapped up in the question as to whether or not work to be electrically welded may be permitted to have flame-cut edges. In the joint paper read in 1932, the British Corporation and Lloyd's Register agreed in suggesting that—

> The question of "fitting" or bringing together various fabricated portions of the hull requires careful thought, and in this connection shipbuilders may learn something from bridge-builders. It may be found that the oxy-acetylene burner can be usefully employed where one side of a "part" has been left full for "fitting," so that there is an overlap between two parts, in which case the two edges are cut out with the burner so that they fit to the required degree and welding can then be done without further dressing of the edges.

There is no question but that this suggestion was intended to apply to the case of members to be connected to form part of the strength of the ship, for not only is the paper itself designed to deal with the extension of electric welding to the main structural members of a ship, but the particular paragraph itself specifically refers to the "hull."

Experts of the British Admiralty have recently categorically condemned the use of flame-cutting tools for the preparation of the edges of important steel members which are to be joined by electric welding. This attitude on the part of Admiralty experts is regarded by the shipbuilding industry as a very serious matter. It seems probable that the objection would have been raised by the Admiralty sooner than was actually the case had the Admiralty been aware of the alleged danger attaching to the proposed practice at the time that it was suggested in the joint paper read in 1932. Apparently data were not available at that time, for no Admiralty expert appears to have spoken on that paper, and it was not until the reading of Mr. Lillicrap's paper in 1933 that those interested in the subject

as it concerned mercantile tonnage were made aware of the strictures which the Admiralty experts had decided must be directed against the ideas of the Registration Society experts on this particular point.

The reaction of these latter to the Admiralty criticisms may be set out most simply by quoting the reply of Mr. J. L. Adam, of the British Corporation, to comments made by Mr. Lillicrap when discussing Mr. Adam's paper "Electric Arc Welding in Ship Construction" read before the Institution of Engineers and Shipbuilders in Scotland in February, 1933. These run as follows :—

Several points have been raised concerning the use of flame-cutting appliances. As the result of extensive experiments it has been found that a certain amount of unreliability attaches to welding upon surfaces cut by oxy-acetylene processes. This does not mean that it is not possible to get a sound connection, but that under present methods there is uncertainty. This criticism, however, does not apply where oxy-coal-gas or oxy-hydrogen-gas is used for cutting and bevelling. In yards where coal-gas cutting has been properly developed, welding has been found to be as reliable and to give as good results as with machine-cut surfaces. It is, therefore, regrettable that the Admiralty has taken the arbitrary and retrogressive step of forbidding the use of flame cutting on surfaces to be welded, instead of giving constructors the option of proving that they could combine flame cutting and welding effectively. This action is the more regrettable in view of the fact that flame cutting permits of a degree of accuracy, good fitting, and the elimination of unnecessary welding which cannot be obtained by using normal shipyard methods."

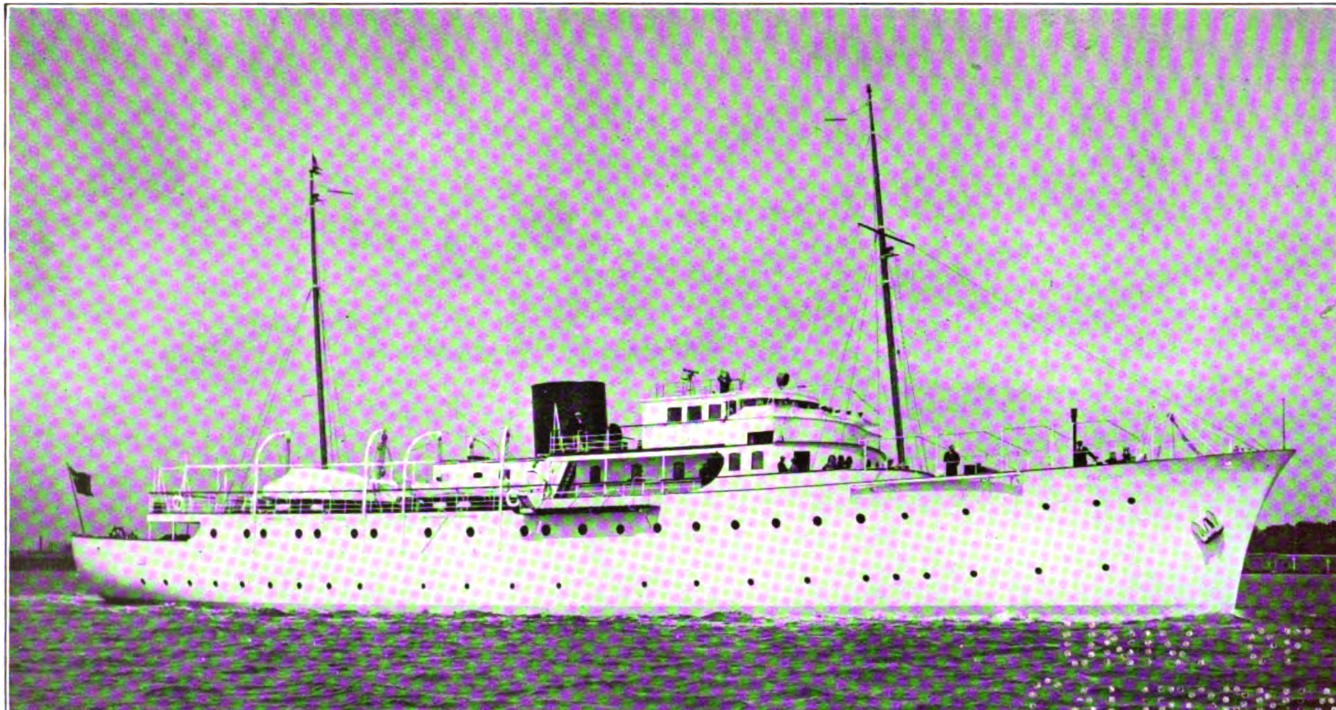
This is not the place to enter into discussion of the merits or demerits of flame-cutting methods upon which this important issue has been raised, but it is highly essential to a proper appreciation of the present technical position of welding in ship construction that it should be known that this point—one of outstanding technical and commercial significance—is seriously in dispute between authorities of such standing as the British Admiralty and the Registration Societies. If it prove to be the case that the attitude of the Admiralty is thoroughly well-founded, and that there is no possibility of bringing flame-cutting apparatus to the assistance of electric welding in the manner contemplated in the joint paper of 1932, it will be necessary entirely to re-cast many schemes which have owed their initiation to the impression created by the remarks already quoted from that joint paper. In any case, it is disquieting to note that actual experience of the effect of oxy-acetylene flame-cutting in conjunction with electric welding has shaken the confidence previously expressed by the Registration Society experts in the combined use of these methods of working. It is better, however, that the shipbuilding industry should be fully aware of such disabilities as have shown themselves than that plans should be embarked upon based on co-operation of oxy-acetylene flame-cutting with electric welding. Elimination of the oxy-acetylene flame-cutting plant from the list of tools permissible in the preparation of steel material for strength purposes in a proposed electrically welded ship would not be a very serious matter in itself, perhaps, since already many shipyards have taken kindly to oxy-coal-gas for flame-cutting purposes in lieu of oxy-acetylene, but undoubtedly the issue of instructions forbidding the use of this latter would have a very serious effect upon the eventual production of electrically welded mercantile tonnage on a commercial basis.

It is sincerely to be hoped that the matters in doubt will be cleared up at the first possible opportunity, and that either the Admiralty will be converted from their present attitude to one favourable to the use of the flame-cutting plant, or that the Registration Societies will revise their previously expressed opinions and place themselves in line with the Admiralty. Final decision, one way or other, must depend upon comprehensive and properly certified experimental results, together with the establishment of satisfactory systems of working, capable of being reproduced with certainty by ordinary qualified workmen under the conditions normally operating in a shipyard. Much will depend upon the outcome of properly authenticated tests, published in full detail.

Recent Practical Achievements.

One all-welded vessel of especial noteworthiness was constructed by electric welding last year—the Peter G. Campbell. It is considered that she represents the farthest stage yet reached in practical acknowledgment of the soundness of electric welding for structural work of primary importance. The Peter G. Campbell is a single skin oil tank barge intended for carrying oil in bulk in Canada, on the Great Lakes and canals. She is roughly 180 ft. by 34 ft. by 15 ft. moulded depth with a draught of about 12 ft. 6 in. Her cargo capacity is given as about 1,620 tons, carried in four tanks adjacent to one another. There are two watertight compartments, one at each end. She was built by Messrs. Swan, Hunter & Wigham Richardson at Wallsend-on-Tyne to plans and schemes of welding work approved by the British Corporation. The slip used was well adapted for the creation of sections of completed work of considerable size, these sections being completely welded up before erection and requiring only the welding of their peripheries to adjacent portions of the structure. Careful planning of the work of preparing these sections and of arranging their erection sequence resulted in the whole of the straight forward portion of the vessel's main structure coming together with a considerable measure of ease, and with a satisfactory standard of fairness in the completed job. It is understood that the ends and shaped portions of the vessel were not of so high a standard of achievement, but this could hardly have been anticipated. Their finish was at any rate workmanlike, and acceptable for the service for which the craft was intended. Of the electrodes with which the electric welding was carried out some gave moderate and some high-grade test results; the former were used in positions in which sound work was required of moderate strength, and the latter where primary stresses had to be carried.

Coming now to the difficulties which might have been expected in securing reliable work, it must be remarked that the whole of the joints of the shell, deck plating, bulkheads, and the greater part of the framing were of the V-butt type, the only overlapped joints being those which were required to effect junction between adjacent portions of the transverses and gusset-plates. For a long time there has been grave suspicion that it would be found impossible, in



THE MOTOR YACHT TRENORA.

(*Builders, Messrs. John I. Thornycroft & Co., Southampton.*)

practice, to make long electrically welded V-butt joints without inevitably locking up appreciable stresses in the weld metal of the joint itself. Generally, the action of welding produces appreciable movement of plates which are being joined by V-butt welds when these plates are free to move. This movement is sufficiently powerful to cause tack welding to tear asunder, to raise buckles of more or less extent, to bring adjacent edges so tightly together that they begin to ride the one over the other, and to give rise to other awkward and disagreeable distortions which require the most expert treatment if they are to be humoured out of existence. Fears have been freely expressed, with apparently good reason, that trouble was likely to result from any attempt to weld—in a large plane diaphragm—long straight V-butt joints, of 30 ft. or so in length, so that two originally parallel lines on the plates joined would remain parallel after the welding had been completed. This problem was regarded as one which was almost incapable of solution, without the creation of serious locked-up stress in the weld metal of the joints.

In the Peter G. Campbell it is claimed that this problem has been solved, and certainly it cannot be denied that there are many very long straight V-butt type joints in her construction, along the edges of the steel shell plates, and also along the edges of the plates forming the bulkheads. These joints have been made, and they have sustained such stresses as have fallen upon them while the craft was crossing the Atlantic and during her subsequent service, without failure so far as is known. Assuming, therefore, that the success of this job is taken as having been established, it may be urged that there is reason why those who have felt doubt as to the adequacy of the type of joint adopted should re-cast their opinions and accept long V-butt welded joints for shell plating.

A cautionary note is needed, however. This vessel is a special case, and there are certain factors which must be given consideration. Apart from the water pressure on her end watertight compartments, when this vessel is wholly or partly loaded her skin may be carrying relatively little diaphragm load. It is probable that the water pressure on the outside of her plating will be substantially the same as the pressure due to her oil cargo or ballast water loading from the inside. Further, the relation of her length to her beam and depth is such that longitudinal stresses on her shell are unlikely to reach figures normally contemplated in a deep-sea cargo ship design. These comments are not intended to detract in any way from the merit of her design and construction, but simply to assist in establishing a basis of comparison for the future assistance of those interested. The Peter G. Campbell, even taking into account all the various circumstances which tend to mitigate the severity of the longitudinal and diaphragm stresses which her hull may be called upon to sustain, is a landmark in the history of the development of the all-welded ship, and a craft whose performances will be watched with very great interest. Nothing like her has been built abroad, nor has any other electrically welded work been done in ships which is comparable with the construction of the Peter G. Campbell, in its possible reaction on the technique of all-welded ship construction in the future.

Some question may be raised in connection with the last statement, in view of the fact that the Sun Shipbuilding & Dry Dock Company have built an all-welded dumb barge for oil carrying which is very nearly as large as the British vessel, the American vessel being 175 ft. by 36 ft. by 12 ft. 6 in., against the 180 ft. by 34 ft. by 15 ft. of the Peter G. Campbell. However, there is really no technical comparison between these two vessels, as they are distinguished by the fundamental difference that while all the joints of the shell of the American vessel are virtually butt strapped by the flanges of the internal stiffeners, on which these shell plate joints have been very carefully arranged to fall, the similar joints of the British craft are entirely clear of the frames. This is a difference which is of great importance, and fully justifies the statement at the end of the previous paragraph.

Apart from the construction of this particular British craft, the strides which have been made with electric welding in the shipyards have been steady and soundly progressive rather than spectacular. There has been a healthy and continued growth of the use of the welding process for the carrying out of work which formerly called for the services of the anglesmith, the blacksmith, the foundry and the forge. "Weldings" are replacing iron and steel castings in every branch of ship and engine work, and there would seem to be little end to the amount of saving to be effected by the sympathetic development of systems of design and planning providing opportunity for the use of pressed and flanged elements joined and stiffened by the use of electric welding.

There has also been a marked increase in the extent to which electric welding has been used for the construction of both main and divisional bulkheads in small ships, and of the less important bulkheads in larger vessels. In some small ships not only has electric welding been employed for the construction of the diaphragm of the bulkheads, but it has also been used for effecting connection between the periphery of the bulkhead and the hull of the ship.

One point is of particular interest in connection with the adoption of electric welding for these internal services in vessels to be classed with Lloyd's Register, as bearing upon the commercial aspect of the matter. If the service on which electric welding is to be employed concerns work which is not of primary structural importance, there are no rigid requirements to be satisfied in connection with elongation, bend, or impact tests. The result is that electrodes of less expensive type can be used; there is also less cost involved in preparing the surface of one run to take the next, and the whole cost of the work is less than when other heavily coated electrodes have to be used in order to satisfy the specification test requirements as laid down by the Registration Societies for work of primary structural importance. Certainly the extent to which there has been increase of the use of electric welding for non-structural work—this without any pressure from owners or from the authorities—indicates that there can be no doubt as to the saving which is effected by the supersession of riveting and other older methods of construction by the new technique.

Prospects and Limitations.

As already mentioned, there has been no spectacular advance in the application of electric welding for the construction of the hulls of ocean-going ships, and it is worth while inquiring as to the possible reasons for this, in view of the technical evidence in existence to prove that electric welding would give a satisfactory and dependable job.

There are three main reasons for the comparative slowness with which this new method of working is making headway :—(1) Lack of suitable designs ; (2) cost of buying and working electrodes of the type essential to the satisfaction of the technical test specifications of British Classification Societies, and (3) existence of grave doubts in the minds of superintendents and consultants as to the possibility of effecting satisfactory and 100 per cent. repairs in case of need to an all-welded ship.

In the opinion of the writer there has not yet been produced a design and system of working which can be confidently recommended as fully meeting all the problems which are involved in the production of a soundly constructed all-welded ship of normal cargo type and form. Present attempts to meet the case are not yet convincing, for they fail to treat the problems which have to be faced in a thorough and whole-hearted manner. The writer has personally put forward several suggestions which approach the problem along lines designed to make the most of electric welding, while keeping in mind the paramount necessity for continuity in work, absence of complication in erection, and inherent stability of the structure of the ship as it is created. These suggestions, however, do not meet all the criticisms which can be raised, and there is need for further careful planning. For commercial success to follow attempts to build all-welded ships, it is positively necessary that suitable designs should be tabled for full discussion.

It is impossible at the moment to offer any reasoned comment on the question of the cost of buying and working heavily coated electrodes. It is one which must eventually find its own level from the pressure of economic forces. Foreign countries are building ships, in considerable part, with lightly coated electrodes. Attention has already been directed to the technical differences which exist between the opinions of our own and foreign experts in reference to the need for the standards of ductility demanded by our Classification Societies. It is essential that these differences should finally be resolved. Upon the direction in which opinions harden will depend the final outcome in regard to this particular matter. Commercial factors may play an important part in determining future policy.

The question of repair difficulties is intimately bound up with the question of design. It is probable that the design which is eventually worked out as suitable for the construction of the all-welded ship will prove itself to be readily adaptable for purposes of repair. This is a reasonable anticipation since it is generally as a logical outcome of really efficient design planning that repair is rendered a simple matter. However that may be, confidence will not be engendered in

the minds of superintendents while there are such differences of opinion among experts on fundamental matters as those which have been instanced. There is undoubtedly urgent need that a sound technical outlook should be shared by all the authorities concerned, official and semi-official, throughout the shipbuilding industry in this country.

Provided that there is a firm resolve to eliminate technical differences, and a concerted attack upon the problem of determining how best electrically welded ships are to be designed in order to enable them to be produced under everyday commercial conditions, it is difficult to anticipate that there will be need to limit the extent of the application of electric welding to ship work. It is far too early to say that any of the problems which confront the designer of an all-welded ship are definitely beyond the possibility of solution, although some of them present extraordinary difficulty.

Nothing is to be gained by too hurried an attempt to make progress, and it is for that reason that stress has been laid, in this article, on the need that advance should be consolidated among technical men stage by stage. Unnecessary risks must not be taken with a development of this character. Incidentally, detailed thought directed to consideration of criticisms advanced from different quarters is productive of a useful reaction—the gradual development of the "welding" sense. A great deal depends upon the method of approach to the design problems to be faced. Designers will eventually reach the right state of mind to see awkward corners from the "welding" point of view, and thereafter rapid progress will follow.

E. F. Spanner, M.Inst.N.A.

CHAPTER XV.

The Rejuvenation of Ships.

In the usual course of events, owners expect to incur a constant expenditure in keeping their ships sound and seaworthy, but frequently they are also faced with the necessity of rejuvenating vessels so as to enable them to meet altered conditions of service or in order to effect some desired economies. Such altered conditions usually arise from the successful competition of newer vessels offering better facilities for the transport of passengers and cargoes; the call for economy is prompted by the lower fuel consumptions now obtained by modern plant compared with those common a few years ago.

In most of the cases which come up for consideration it is possible, at a price, to obtain greater speeds and lower fuel consumptions per unit of power developed. It is not always proved, however, that the outlay proposed would be recouped to the owner in the remaining years of service which the vessel is likely to have. Careful calculations are therefore necessary before embarking on any extensive scheme, but many of the proposals which are now put forward for increasing speeds or securing economy in power and therefore in fuel consumption cost comparatively little and can easily be adopted.

Passenger Liners.

This problem of rejuvenation is not peculiar to cargo ships. Most of the first-class liners, at some time or other, have undergone extensive alterations, some of which have proved to be of immense value to their owners. Perhaps the greatest effort in this connection was the reconditioning of the Leviathan. This great ex-German liner was "interned" during the War and was left for many months unattended. Subsequently the need for such a vessel for the transport of troops from the United States became urgent, and to the engineers of the U.S. Navy Board was given the task of getting her into condition. No plans of her piping arrangements were available, the vessel was resting deep in mud, and her machinery was radically out of order; but by dint of immense energy and the enthusiastic co-operation of various engineering works the necessary repairs were carried out, and an achievement was accomplished which the engineers who had been in charge of the ship when operating under the German flag had declared to be impossible. Notable service was rendered by her in the transport of troops. Subsequently she was reconditioned for passenger work at immense cost. This did not prove to be commercially sound, and the vessel was taken out of active service.

Among the vessels requisitioned from the Germans was the Tirpitz, which was taken over by the Canadian Pacific Company and renamed the Empress of Australia. She was of about 22,000 tons gross, and had splendid passenger accommodation, but proved to be very uneconomical in service and too slow for the Atlantic passenger trade. So serious was the position that it was determined to gut the whole of the propelling machinery with the boiler installation and install modern plant. To the Fairfield Company was given the contract to effect the necessary alterations. The impulse-reaction turbines with their hydraulic reduction gears were removed and Parsons turbines with single-reduction gear substituted. The water-tube boilers of a modified Yarrow type were discarded in favour of double-ended cylindrical boilers designed for a working pressure of 220 lb. and fitted with superheaters to give a superheat of 240 deg. F. at the boilers. As the result of these alterations an extraordinary improvement was effected. The best sea speed over a number of voyages with her original installation was 16½ knots on a consumption of 205 tons of fuel a day. After reconditioning, a trial speed of 20·35 knots was obtained, and assuming a mean ocean speed of 19 knots the fuel consumption was reduced to 150 tons a day. The credit for this vast improvement was due in great measure to the initiative and courage of Mr. John Johnson, the Chief Superintendent Engineer of the Canadian Pacific Steamships.

The Aquitania.

One of the favourite ships on the Atlantic is undoubtedly the famous Cunarder Aquitania. She entered service in 1913, and originally was a coal-burning vessel. In 1922 she was altered to oil burning, definitely improved speed performances resulting. At the time of her construction the class of accommodation provided was equal to that of any vessel of her type, but when the oil-burning arrangements were installed opportunity was taken to bring her cabins more into line with the ideas which had developed in the intervening years. The original arrangement of certain first-class cabins on C deck is shown in Fig. 1, and the arrangement as effected during her extensive alterations in Fig. 2. The advent of the latest German liners, Europa and Bremen, caused the Cunard officials to seek further improvement in the standard of accommodation in their large vessels, and the latest arrangement (1933) of this section of the accommodation in the Aquitania is shown in Fig. 3. These diagrams indicate the nature of the problem with which shipowners are faced. Normally the hull of such a ship has a life of from twenty-five to thirty years. This vessel had won a reputation for steadiness and comfort, and her owners could not afford to allow this reputation to be lost because of inferior cabin arrangements. They had, therefore, to sacrifice numbers to standard, and provide the desirable conveniences which enhance the "selling" qualities of cabins.

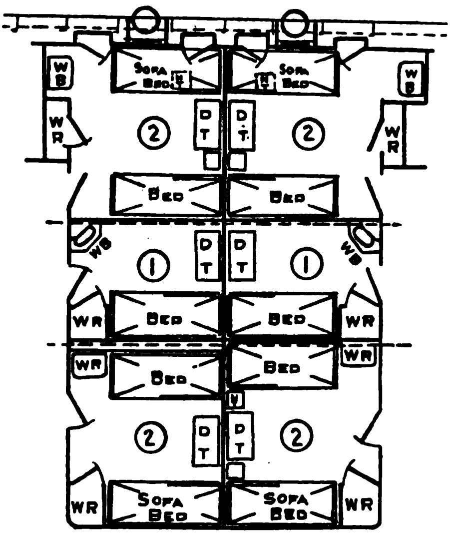


Fig.1.

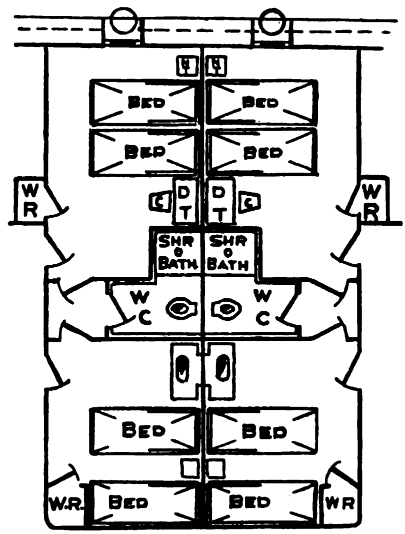


Fig.2.

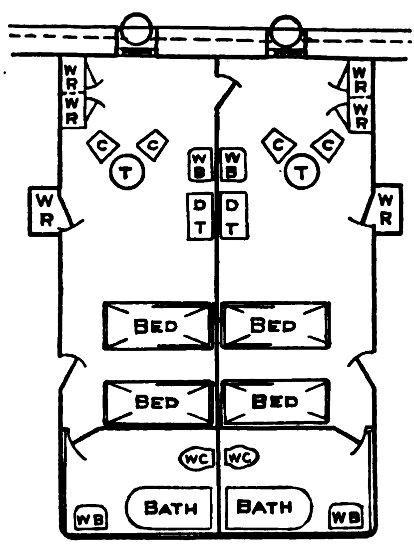


Fig.3.

Increased Speed.

The three instances given above indicate how necessity for a particular war service, for securing economy, and for securing passenger trade by providing really first-class accommodation has called for rejuvenation; when the call is for higher speed the problem is not so easily solved. Take, for instance, the cases of the two 22,000-tons liners Asturias and Alcantara. These large vessels,

built for the South American passenger service, had Diesel engines capable of giving a speed of 17½ knots. Since the ships were placed on service in 1926, Continental lines have built speedier ships, and Lord Essendon, the chairman of the Royal Mail Lines, last year intimated that it was felt necessary by his Board to provide faster tonnage in order to maintain the goodwill. Accordingly it was decided to substitute geared turbine machinery for the internal-combustion engines originally provided. It is understood that three Johnson water-tube boilers are to be installed, and that the machinery alterations will involve no modifications to the existing two lines of shafting. The lines of the hulls are to be modified to suit the increased speed with which the ships are to be provided. Messrs. Harland and Wolff, Belfast, it was stated, were to carry out these extensive alterations.

It might seem to be a reflection on the utility of the internal-combustion engine that such alterations should be necessary in comparatively new ships, but this is not the case. Rather there appears to have been a want of foresight as to the possible requirements of the service with the development of trade. An inherent weakness of Diesel machinery is the lack of flexibility; no "pressing" of the engines is permissible, and if attempted may lead to serious results. Experience has shown, on the other hand, that turbine machinery has usually a wide margin over the designed power. In the case of the Mauretania, the machinery was originally designed for 68,000 s.h.p., but at least 90,000 s.h.p. must have been reached during her attempt to break the record of the Bremen.

These Royal Mail liners are not the only vessels which have been handicapped by having machinery installed incapable of meeting fresh situations as they have developed. On the New Zealand service, for example, the requirements have altered within the past few years, and in vessels built a few years ago to carry the maximum amount of cargo at a speed then considered sufficient, an increase in speed of from 2 to 3 knots is now seen to be possible, but cannot be obtained without carrying out drastic alterations similar to those being effected in the Asturias and Alcantara.

The Slamat.

Increased speed can be obtained in a variety of ways dependent on the amount required and the type of vessel that is to be modified. Some attention was recently attracted to the case of the Slamat, a vessel originally 500 ft. in length, 61 ft. 8 in. in breadth, and 38 ft. in depth. She was built for the service between Holland and the Dutch East Indies and had an average speed of 15 knots. In order that she might be able to take her place in a service maintained by newer vessels on the same route, having 17½ knots speed, the owners were anxious to increase her speed by 2½ knots. This was successfully accomplished by alterations in several directions.

Originally the vessel was coal-burning, and it was determined to equip her as an oil-burner. The boilers were of ample capacity for a greater engine output, and it was found possible by some alterations

to the turbine machinery to increase the power by about 25 per cent. This increase in power was estimated to bring about an increase of about one knot in the speed. The remaining 1½ knots had to be found by altering the ship's form and the propellers. Towards achieving this end the forebody was lengthened by 15 ft. on the waterline, the Maier form being at the same time applied to the forebody, the propellers were altered, a streamline rudder was fitted, the bilge keels were reduced in length, and, finally, the shaft bossings were altered.

It would be difficult to assign to each of these factors its proper share of the improvement which was effected, for each of them has been applied separately in particular cases and afforded some measure of improvement.

Oil Fuel.

To begin with, the introduction of oil fuel makes possible the continuous use of the full boiler installation in ships. It is the case that the necessity for cleaning out the fires and the difficulties attending the maintenance of steam in a coal-burning ship reduce the "possible" supply of steam by from 20 to 25 per cent. The achievements of the Mauretania after her conversion to oil-burning indicate the effectiveness of this change.

It has already been suggested that turbine machinery can respond to higher steam pressure and give results considerably in excess of the power originally intended. With the alterations which were made in the turbines of the Slamat the 25 per cent. increase in power expected would easily be procured.

Effect of Length.

It is known that increase in length is an important factor towards reducing resistance, but it does not follow that the addition of 6 per cent. to the length of the forebody, as was adopted in the Slamat, would afford a reduction of, say, 10 per cent. in resistance in all cases. The percentage reduction is not constant; it depends on the efficiency of the form being tried and also on the speed-length ratio of the vessel in question. In the course of some experiments made with a form at Haslar, it was found that an increase of 5 per cent. in the length of the forebody brought about a decrease in resistance of 10 per cent. Similarly, it is known that the additional length secured by the adoption of a cruiser stern, in vessels of the cross-channel type in particular, has a remarkable effect on the speed; but the effect on the speed of the adoption of a cruiser stern is not nearly so pronounced in, say, cargo ships of about 450 ft. in length of 14 knots speed. While the reduction in resistance in the case of a cross-channel steamer at her particular speed may be 10 per cent. or more, in the case of such a cargo ship as that indicated the reduction may amount to only 2 or 3 per cent. The effect of increasing the length of the forebody, therefore, must form the subject of special investigation in each case as it arises.

Maier Form.

Associated with the increased length of forebody a Maier form was adopted in the Slamat. How much of the improvement was due to this particular form it is impossible to judge; it is quite probable that it was responsible for a part of the gain in speed. A great deal of discussion has arisen regarding this and other unusual types of lines. The opinions of recognised authorities are divided on the question. Some argue that "normal" forms can be produced to give quite as good results as those designed to special ideas, others hold that a very high standard has been set by the latter. As far as can be judged there does not seem to be any valid argument against the probability of the Maier form being more suitable for particular cases than hulls with sections of normal type. It is recognised that easy bow lines are very desirable for certain conditions, and the Maier type definitely affords easy bow lines. In the same way as particular and definite types of sectional area curves are suited for different classes of vessels, so it is reasonable to suppose that Maier forms have their particular field of application. The performance of the Slamat would point to this probability.

Propellers.

Information is not available regarding the original screws of the vessel under discussion and those afterwards fitted. There are many vessels afloat whose performances have been improved through changes being made in their screws. One particular case was cited some years ago of a vessel whose speed was increased by two knots or thereabouts, by alteration in the screws alone. This was an exceptional case, and pointed to the utter unsuitability of those originally fitted to the task assigned to them. In well authenticated cases, however, an increase in speed of at least half a knot has been obtained by changes of this kind. Apart altogether from claims which may be made regarding the benefits to be derived from the adoption of "patent" screws, it is definitely established that solid propellers with small bosses are more efficient than built screws with large hubs; further, that bronze screws, having thinner blades and smoother surfaces than those of cast-iron, give much better results. In particular cases, there may be some advantage in having "aerofoil" blades. There is no doubt that owners who desire that the best results possible from their vessels as they stand should have the advice of experts regarding the design and condition of the propellers. There are a select number of firms in this country which have made a study of propulsion, and are capable of providing screws of excellent design and material, and which would willingly advise in this connection. The fact that the Slamat's screws formed one of the factors in the reconditioning programme indicates the importance of this particular feature.

Streamline Rudders.

It is not surprising that the streamline type of rudder was adopted in the rejuvenated ship. A great deal of attention has been paid in recent years to the stern appendages of vessels, with beneficial results. Some extraordinary improvements in results have accompanied the adoption of devices for reducing the eddy-making which is prevalent at the sterns of most vessels. In some single-screw vessels the power has been reduced by as much as 16 per cent. by the alterations carried out in the region of the propeller, including the adoption of streamline rudders. Twin-screw vessels do not offer the same wide scope for improvement as do the majority of single-screw ships; nevertheless it is generally possible to effect some saving in power by the adoption of well-designed rudders instead of those of the single-plate type with heavy pintles.

Bilge Keels.

In the Slamat the bilge keels were reduced in length, and this alteration would contribute slightly to the improvement made. It was considered that they were interfering with the normal flow of the stream lines; if so, shortening them would bring about some benefit. As a serious contribution to the general question of re-conditioning this particular factor is negligible, although it is important, when fresh tonnage is being built, that the line of the bilge keels should be determined from records of the streamline flow as determined by model experiments.

Shaft Bossings.

Such an alteration as reconstructing the shaft bossings of a vessel is seldom undertaken. It is a costly operation, although it may result in a rapid refunding of the outlay in reduced consumption for a given speed. What the original bossings were like in the Slamat is not known to the writer, but the great part which is played by angle of bossing on the propulsive results of a vessel may be gathered from Luke's papers on "Wake and Thrust Deduction." His investigations show that the added resistance due to these appendages depends largely on the angle at which they are set. This angle has a dominating influence on the wake which follows after a ship, and also on the thrust deduction, which causes a virtual increase in the ship's resistance. The combination of these two factors, viz. the wake and thrust deduction, affords what is termed the "hull efficiency." If this is over unity the gross result should be beneficial to the ship's propulsive qualities. Another term, the "rotative efficiency," comes into consideration, and this indicates whether the propeller itself is being influenced either for the better or the worse by the conditions under which it is operating. In order then to assess the gross results associated with any particular angle of bossing it is necessary to know (*a*) the increased resistance caused by it, (*b*) the hull efficiency value, and (*c*) the "rotative efficiency."

This investigation should be carried out with all twin-screw ship models, and the angle of bossing finally assigned as the result of the investigation.

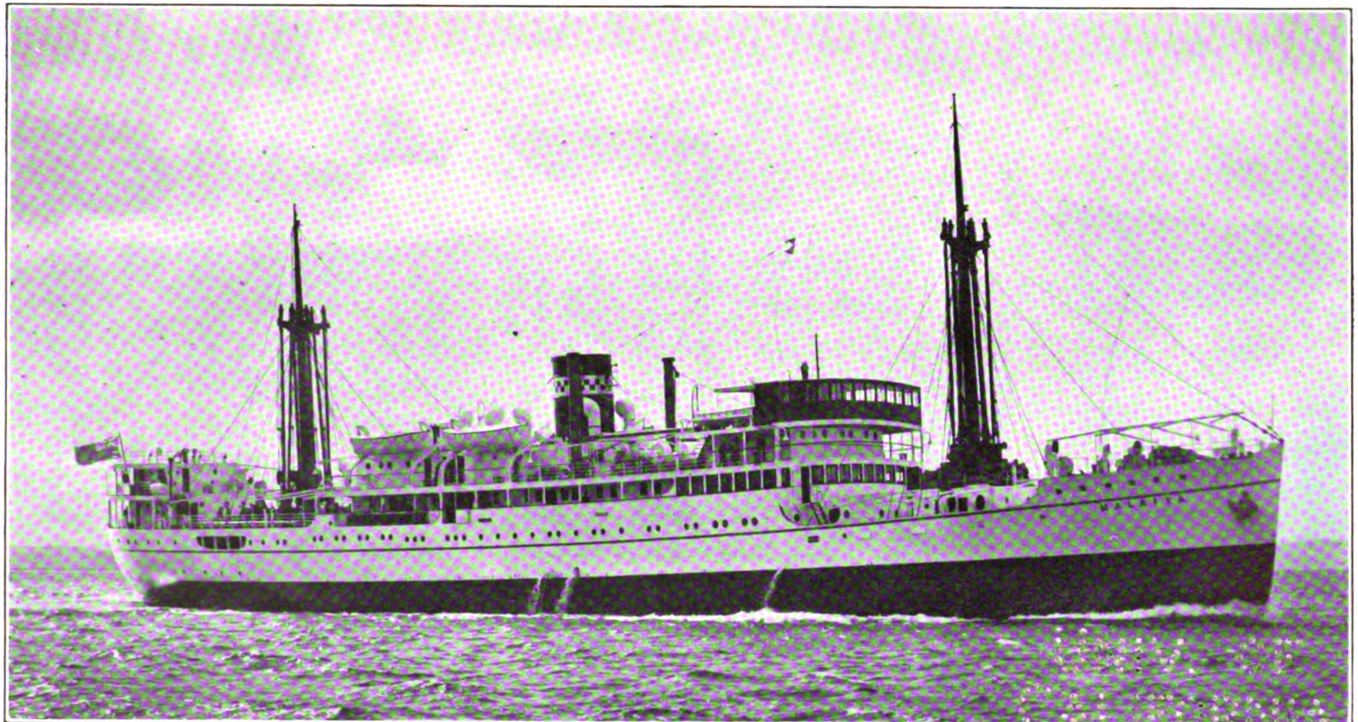
Associated with this particular aspect of the propulsion problem is that of the desirable direction of rotation of the screws. In the majority of vessels these are made to turn outwards, but it has been found better in certain cases to have them rotate in the opposite direction. In the case of the Lysistrata, built by Messrs. Denny, an increase in speed of almost one knot was obtained by change in the direction of rotation.

It is possible, therefore, that among the other factors which contribute to the greatly improved speed of the Slamat, the alterations to the bossings had a fairly large share. Some consideration has been given to this particular case because so many of the methods which are recommended for improving the results of ships have been embodied in the vessel.

Guide Blades.

Since the introduction of the screw propeller in 1836, a great many devices have been put forward to increase its efficiency. As long ago as 1866 Mr. Arthur Rigg experimented with his "deflector vanes," which consisted of flat plates fixed abaft the propeller, so as to deflect the propeller stream directly astern and so increase the thrust. This device met with some measure of success, but mechanical difficulties put an end to its development. Later, in 1880, Sir John Thornycroft devised what he termed a "screw turbine propeller." This consisted of a fixed tube or cylinder carrying two sets of guide blades between which was a propeller in which the pitch at leading edge multiplied by the number of revolutions was approximately equal to the velocity of the water entering the tube. As the pitch of the propeller increased uniformly a uniform acceleration was imparted to the water, while the guide blades at the after-end of the tube had a contrary curvature which directed the water into a straight line astern. This device was adopted in several shallow-draught vessels with some measure of success.

Mechanical difficulties have, so far, prohibited the adoption of two screws on the same shaft, these screws revolving in opposite directions. From experiments carried out by Rota and others some advantages appear to lie with this arrangement. It was considered that part of the gain which apparently was disclosed by this disposition of the screws could be obtained by having the equivalent of a "fixed" screw placed behind the propeller. In the 1925 *Transactions* of the Institution of Naval Architects the "Star" contra-propeller is described, and the improvements in efficiencies which have accompanied its adoption are set forth. In the cases of the sister ships Silverpine and Silverlarch, a gain in speed of three-fourths of a knot was secured without increase in power. Guide blades have since been fitted in many ships with varying degrees of success. In some cases a reduction in the number of blades seemed to have little effect on the performance. This led to special attention being given to the shape of the rudder post in single-screw ships. Baker has



THE BURNS, PHILP MOTORSHIP MALAITA.

(Builders, Messrs. Barclay, Curle & Co., Glasgow.)

shown that the fitting of a fin plate on the fore side of the rudder post is a distinct advantage in single-screw ships; the results of his experiments are recorded in the *Transactions* of the Institution of Naval Architects for 1928.

Guide blades have been fitted in some of the Blue Star liners with definite improvements in results, but it does not appear that twin-screw vessels can benefit to the same extent as is possible in single-screw ships.

Of all the alterations which can be carried out at reasonable cost, that pertaining to the fitting of guide blades seems to be the one which offers the most beneficial return.

Hull Form.

Only in exceptional cases do owners contemplate the expenditure necessary for a radical alteration of the forms of their vessels. In the Alcantara and Asturias this is being done to make them suitable for the higher speeds to be attained with the greater power to be developed. Although this alteration is necessary in these ships, in a notable case which came up for consideration a year or so ago it was found that the form already given was perfectly suited for a much higher speed than the vessel possessed. A well-known company went to considerable expense, some time ago, in altering the fore-ends of a group of ships which suffered greatly through "pounding." So flat were the sections forward that the bottom plating was "stove in" by pounding, and rounder forms were perforce adopted.

It is quite probable that a large number of cargo ships could be greatly improved in performance were new after bodies given them, but this alteration would necessitate model experiments and subsequently vast structural changes.

Machinery.

Some indication of the importance which is attached to the rejuvenation of ships may be gathered from the large number of contracts which have been placed for reconstruction of machinery. In an editorial article in the *Marine Engineer* of August last, it was stated that during the past 18 months or so the North Eastern Marine Engineering Company alone had converted upwards of 100 steamers to superheating. The most attractive form taken by such conversions has been to superheat the steam to about 600 deg. to 650 deg. F., and simultaneously to renew the high-pressure cylinder, fitting it with double-beat poppet or patent balanced slide valves, one each for steam inlet and exhaust at top and bottom instead of the usual single high-pressure piston valve. At the same time air preheaters and feed-water heaters and filtering arrangements are brought into line, and boilers, steam pipes, cylinders, etc., are efficiently insulated at all points to eliminate heat losses. Having reconditioned the machinery of one of their steamers on these

general lines some months ago, Sir R. Ropner and Co. have now placed a contract with the Central Marine Engine Works of William Gray and Son for a similar renovation of the machinery of no fewer than fourteen ships.

In a paper read in 1932 to the North East Coast Institution of Engineers and Shipbuilders, Mr. Andrew Hamilton indicated some of the suggestions which are being put forward by engineers to bring about reductions in fuel consumption and economies in running costs. These included the adoption of Bauer-Wach turbines with or without superheat, and also the Gotaverken system. With the former, without superheat a saving of 17 per cent. was anticipated, and with superheat a saving of 23 per cent. With the Gotaverken systems 17 per cent. was the likely economy. If the exhaust turbo-electric system and superheat were adopted with quadruple-expansion engines a saving of 25 per cent. might be expected.

In these arrangements greater expansion of the steam is obtained by the introduction of a turbine between the low-pressure cylinder and the condenser, so securing the advantage of using a higher vacuum. The Bauer-Wach system has been extensively used in many recent conversions, more especially when increased speed has been the chief aim, the additional power given by the low-pressure turbines increasing the speed from 0·71 knot upwards. When additional speed is not required, and the saving of coal when running at the original speed is the objective, the cost of conversion may be considered prohibitive in tramp tonnage for the results obtained. In the Gotaverken system the exhaust steam drives a turbine which is direct-coupled to a rotary compressor which draws the steam from the exhaust of the high-pressure cylinder, compresses it, superheats it, and discharges it into the intermediate cylinder. By this means additional power is obtained, or alternatively economy in fuel.

Messrs. Parsons and Messrs. Brown-Boveri have systems in which the exhaust turbine is geared mechanically to the line of shafting. In the Metropolitan-Vickers and British Thomson-Houston arrangements the power is transmitted to the shafting through an electric motor. One of the largest machinery conversion contracts of this character to date is that recently placed by the Ellerman Lines with Messrs. Workman Clark, involving the fitting of the Metropolitan-Vickers turbo-electric system to six ships. Messrs. William Beardmore and Co. have been responsible for the installation of Bauer-Wach exhaust turbines in a large number of ships including many Clan liners. During the discussion on Mr. Hamilton's paper mentioned above, Mr. P. L. Jones, of Messrs. Swan, Hunter and Wigham Richardson, said that his firm had then constructed 41 sets of Bauer-Wach exhaust turbines. Included in that number are five ships of one fleet, and the average results of these ships show an improvement of 27·8 per cent. Mr. Jones also said that for a combined output of 2,500 i.h.p. the difference between the first cost of an ordinary triple-expansion installation and a Bauer-Wach installation would be about £5,000. Further, that the cost of fitting this on board an old vessel, including the incidental hull alterations, would be in the neighbourhood of £10,000.

Reference has already been made to the work of reconditioning carried out by the North Eastern Marine Engineering Company. In this connection Mr. John Mill has stated that during the last twelve years this particular firm have been associated with 124 cases of rejuvenation of machinery, all embodying the fitting of superheaters, and of these 79 were repeat orders ; further, that 38 vessels have been dealt with in which existing superheaters were modified to give an increased temperature of steam up to about 630 deg.

In this article an endeavour has been made to indicate the general directions in which improvements in performances are being sought and obtained. It has been impossible to enumerate many of the devices to which the attention of shipowners has been drawn, and lack of specialized knowledge may be responsible for the omission of some engineering features which deserve mention. Sufficient has been said, however, to justify the conclusion that owners, shipbuilders and engineers are alive to the necessity of bringing existing tonnage up to the standard of modern vessels, if that can be done. A few consider that the " putting of new wine into old bottles " can rarely be justified, but the evidence is overwhelming that the installation of many of the improvements mentioned above have well justified the expenditure entailed.

So far as the hull is concerned, tank tests have been responsible for the production of forms which are considerably better than those common, say, ten years ago. It is impossible to eliminate the handicap which old ships possess in this direction. It is possible, however, to secure reduction in eddy-making at the stern of most vessels, and this can be done at moderate cost.

With regard to economy in fuel consumption, the cost involved in the installation of new devices must be considered in the light of the length of service of the vessel and in the savings likely to be effected. This is the special consideration of owners. Engineers have already provided the means whereby these economies can be made, but at a cost which owners may not be prepared to face.

" CONSTRUCTOR."

CHAPTER XVI.

Mercantile Marine Machinery.

The past year opened with a more hopeful spirit than had been seen during the last five or six years, as the end of 1932 marked the placing of orders for a number of merchant vessels, which, though small in comparison with the productive capacity of the country's yards, were extremely welcome in a time of virtual famine. Had it not been for the allocation of a number of contracts by the Admiralty for the cruisers, destroyers, and smaller auxiliary craft of the deferred 1931 Programme, followed soon after by those of the 1932 Programme, the prospects of most of the large engineering works would have been very serious indeed. Even so, only a meagre part of the capacities of the marine engineering shops was being utilised, as the reduced volume of Admiralty work—divided over a large number of firms—was insufficient fully to relieve the situation, and the flow of merchant work, which in the past has frequently been experienced as a consequence of revived warship construction, unfortunately failed to materialise in this instance.

World trade has shown little improvement, although this country appears to be in a slightly better condition than the other maritime nations. Certainly in the middle of the year, the Board of Trade returns indicated a departure from the depressingly steady downward trend, and there was an improvement in the figures of unemployment, but freights persistently remained at so low a level that the position as regards the great volume of laid-up shipping was practically unchanged, and little inclination to acquire ships with modern machinery was in evidence, even among the most enterprising and progressive shipowners.

Modernisation of existing machinery proceeded to a very moderate extent, but the strangling effects of the instability of the exchanges (particularly the violent fluctuations in the value of the dollar) and the failure of the World Economic Conference last midsummer to achieve any substantial results were felt acutely throughout the industry. The amount of suspended tonnage, partly built, was not appreciably diminished, but the volume of scrapping increased, and this was possibly one of the brightest features of a year in which conditions were extremely discouraging. The comparative figures for tonnage and horse-power under construction in the principal shipbuilding countries for the last three years, given in Table I., show that the meagre world totals continued, the sole improvement being a very slight increase in the total horse-power of motorships, although the total tonnage of this class is still falling. The quantities

for motorship tonnage and horse-power have risen in Japan and this country, but the figures for all the other countries show very heavy falls except the power figures for Holland, where several conversions of existing ships are in hand.

TABLE I.

TONNAGE UNDER CONSTRUCTION IN CHIEF SHIPBUILDING COUNTRIES.

	Steamers.			Motorships.		
	June, 1931.	June, 1932.	June, 1933.	June, 1931.	June, 1932.	June, 1933.
Great Britain	339,700	245,370	205,804	213,400	34,780	81,118
France	166,100	84,740	72,286	45,800	43,390	20,120
Germany	12,000	2,200	3,005	118,400	101,300	46,850
Holland	5,300	435	435	103,000	48,140	31,288
Belgium	—	—	—	2,200	4,860	3,200
Italy	103,300	101,520	—	67,300	79,050	27,076
Norway	9,000	1,840	6,730	13,800	9,260	2,680
Sweden	9,300	5,830	1,372	101,100	83,370	76,860
Denmark	3,500	2,925	7,360	87,100	17,450	19,823
Japan	6,400	19,850	8,100	39,900	23,820	74,180
Spain	200	—	3,860	60,500	33,270	29,652
U.S.A.	284,000	161,400	1,800	15,100	800	503
Total	938,800	626,110	310,752	867,600	479,430	443,150
Per cent. change compared with 1931	—	−33½%	−67%	—	−44½%	−49%
Per cent. change compared with 1932	—	—	−50½%	—	—	−7½%

HORSE-POWER UNDER CONSTRUCTION.

	Steamers.			Motorships.		
	June, 1931.	June, 1932.	June, 1933.	June, 1931.	June, 1932.	June, 1933.
Great Britain	425,400	290,970	262,333	134,400	22,310	62,884
France	109,300	196,800	166,540	44,500	33,390	15,660
Germany	31,000	4,450	8,052	168,400	90,650	38,969
Holland	5,800	1,450	1,585	81,700	39,540	87,038
Belgium	700	700	—	2,100	20,200	17,000
Italy	239,300	237,000	—	112,000	69,800	15,200
Norway	13,000	700	2,800	6,000	3,000	5,800
Sweden	4,500	6,300	1,450	91,800	65,410	65,675
Denmark	2,000	3,175	4,250	87,800	18,200	13,928
Japan	6,500	15,200	7,000	27,700	22,700	73,200
U.S.A.	339,000	182,200	1,000	13,800	5,710	4,876
Total	1,156,500	923,745	455,010	770,200	390,910	400,230
Change compared with 1931	—	−20%	−60·5%	—	−49½%	−48%
Change compared with 1932	—	—	−50½%	—	—	+2½%

In examining the table it must be borne in mind that in this country, of the 205,800 tons of steamers under construction, work was suspended on 134,000 tons, 50 per cent. of which was represented by the new Cunarder, and on 6,000 tons of the 81,000 tons of motor-ships. The corresponding total of suspended tonnage for all foreign countries amounted to 24,250, and 1,560 tons for steamers and motor-ships respectively.

The scanty outputs revealed by the statistics will clearly indicate that the enormous technical advances of the last few years can only have been tried out at sea to a very limited extent, and that there is still a large field open for the modernisation of vessels of a moderate age, to bring them into line with the latest practice, immediately financial conditions warrant such expenditure. In the meantime, there appears to be little likelihood of an extensive programme of new construction. Until the total available tonnage is heavily reduced by senile decay and loss (the latest figure of Lloyd's Register is 2 per cent. per annum of total owned) the lean years must necessarily continue, and naval work must remain the principal stimulant for keeping alive a very debilitated industry, until international agreement regarding the removal of ever increasing trade barriers, such as tariffs, quotas, subsidies, flag discrimination, and the like, can be achieved, of which there seems to be no immediate promise.

Boilers and Fuel.

Possibly the outstanding feature of the year was the number of ships for the boilers of which—practically all of the water-tube type—mechanical stokers were being supplied. Following on the successful application of this equipment to the Duke of Lancaster of the L.M.S. Railway's Heysham–Belfast service, the same company decided to fit similar stokers in their new Stranraer-Larne steamer, building by Messrs. Denny and Co., while the Great Western Railway Company adopted a similar design for their new Fishguard–Waterford cross-channel packet. In both of these cases the Erith-Roe type was adopted with Babcock and Wilcox boilers.

Certain of the Canadian Pacific "Beaver" ships have now been in service for some years with mechanical stokers, some of the Erith-Roe retort type and others of the Taylor design. The latter was adopted for the three new Southern Railway train ferries, the boilers being built by Messrs. Yarrow; while the former type was chosen for the Babcock boilers of the other railway companies' steamers and in the China Navigation Steamer ordered from Messrs. Scott.

Little was published about the progress of pulverised fuel for marine work, but two Japanese steamers, the Johore Maru and Nagoya Maru, were put in service with Messrs. Clarke Chapman's type of plant, and are understood to be giving excellent results. The initial first cost of pulverised fuel plant, however, still remains too high to warrant its general adoption in ordinary merchant steamers, in spite of the facility with which the boilers can be

readily changed to burn oil fuel or powdered coal in accordance with the current relative commercial values of the two types of fuel, as was strongly advocated by Mr. J. Johnson in his 1932 paper to the Institution of Naval Architects.

In the early part of the year a proposal by the same authority for a machinery installation—developed in association with Messrs. Howden—received wide publicity. This consisted of an improved cylindrical boiler embodying a water-tube type of combustion chamber somewhat on the lines of the Prudhon-Capus design, but fitted with forced and induced draught fans, which arranged for the products of combustion to be led, after washing, through a Ljüngstrom rotary air heater direct overboard, eliminating entirely the usual funnel, and also securing a maximum possible recovery of heat units throughout the system. The overall efficiency of such an arrangement would undoubtedly be high, but it seems questionable whether the gain ensuing from its adoption would warrant the initial expenditure involved. Mr. Johnson's design of high-pressure water-tube boiler, has, it is believed, been under consideration by certain naval authorities as an alternative to the usual three-drum design, and is, it has been stated, being adopted for the steam-generating plant which is to replace the internal-combustion engines in the Alcantara and Asturias of the Royal Mail.

Messrs. Denny introduced a novelty for cross-channel steamers in the Brighton, the single-sided Yarrow boilers of which embody tubular air heaters arranged horizontally, through the tubes of which the air passes, the gases being outside the tubes and dealt with by induced draught fans.

During the year, a number of ships were converted to superheating, principally on the Tyne. On the Continent experimental work was carried out on a considerable scale with pulverised fuel equipment, with the La Mont water-tube circulating system as applied to cylindrical boilers, and with development of the Benson boiler, in which the pressure has been substantially reduced.

Messrs. Richardsons, Westgarth and Co. have taken up and are developing the Brown-Boveri Velox design of water-tube boiler. The principle used is that of employing extremely high gas velocities past the heating surfaces, these high velocities being obtained by burning liquid or gaseous fuel under pressure. The resulting gases are led to a turbine which drives a compressor to produce the pressure required for this intensive combustion, and consequently a large proportion of the energy required for driving the compressor is returned to the boiler as heat in the combustion air. It is understood that several units are in course of construction, but have not yet been tested out at sea. The principal claims made for the boiler are reduction in size and weight for a given evaporation, with rapid steam raising characteristics and great flexibility. The design is a complete departure from existing practice, and a very considerable time will probably be required for it to become established as a steam generator for mercantile work.

Reciprocating Engine Improvements.

It was noted in last year's survey that there had been an intensive period of research work among marine engine builders to secure enhanced economy without substantial increase in cost of the normal triple-expansion reciprocating engine, and that the principal devices by which it was sought to attain this end consisted in modifications of the methods of steam distribution and the phases of its cycle during its passage through the cylinders. This activity was continued during the succeeding year, and new designs were produced by the North Eastern Marine Company in this country and Messrs. Burmeister and Wain in Denmark. There were also a number of conversions from the slide-valve to the poppet-valve type, particularly in the high-pressure cylinders, in conjunction with the application of superheat, for which the poppet valve is eminently suited. It is understood that conversions of this character are being undertaken in certain of the P. & O. "R" class steamers. The system designed by Messrs. Andrews and Cameron, in which two or more small balanced valves operated by cam gear replace the large piston valves, was applied to a Maclay and McIntyre vessel, the Janeta, by Messrs. Stephen, and by Messrs. Rowan to some Harrison Line ships.

The realisation that compound engines fitted with poppet valves and with low-pressure cylinders of the Uniflow type can show economies better than the older triple has now become more general, particularly when associated with superheated steam, as is almost invariable practice on the Continent. A small trawler compound engine equipment of 750 i.h.p., with cylinders 14 in. and 25½ in. by 25½ in. stroke, working in conjunction with an exhaust turbine, has given the remarkable figure of 7·91 lb. of steam per i.h.p. hour.

The North Eastern Marine Engine Company's design has poppet valves in the high and intermediate-pressure cylinders operated by Stephenson link gear, but the exhaust steam from the high-pressure cylinders is reheated by means of a live steam heater before its entry to the intermediate-pressure cylinder, the boiler heating steam used for this purpose being passed into the high-pressure cylinder after having had its temperature reduced by about 130 deg. F. by transfer of heat to the high-pressure exhaust in its passage through the heater. The principle of reheating the high-pressure exhaust is similar to that used in the Lindholmen exhaust turbine system, in which the power from the turbine is converted to electricity, which in turn is partly utilised for this purpose. In the North Eastern Marine Company's engine, however, the temperature of the steam as generated by a specially designed boiler and superheater is of the order of 750 deg. F., but does not exceed 600 deg. when admitted to the high-pressure cylinder, and is thus in accordance with the normal practice.

Particulars were published of a three-cylinder compound engine of the new Burmeister and Wain design. Piston valves are employed in all three cylinders, and the engine is of the semi-Uniflow type, part of the steam being exhausted through a centre belt and part through top and bottom ports. The example in question, an engine

with cylinders 18 in., 27½ in. and 27½ in., and a stroke of 27½ in., gave with 210 lb. pressure, 200 deg. F. superheat, and 27·4 in. vacuum a consumption of 10·3 lb. per i.h.p., a figure which should be compared with the 7·91 lb., given by the combination poppet-valve engine with exhaust turbine mentioned above.

Messrs. Stephen of Linthouse built a demonstration engine of their three-cylinder compound design with forced lubrication. In this the low-pressure cylinders are of the Uniflow type with a valve gear of the Andrews and Cameron balanced slide-valve design operated by oil pressure from a special rotary distributor. This engine embodies other modern features, such as separate steam and exhaust valves, quick opening and release, etc. Past experience with oil-operated valves—they were applied to the internal-combustion engine of the Dolius and a few Continental vessels of the Maier Mattern design—has not, however, led to their extensive adoption, the principal objection being the difficulty of locating the position of a defect in the pressure oil system, should such occur. With a purely mechanical valve-operating gear any abnormal working is at once obvious and can usually be remedied forthwith. Even though time lag can be satisfactorily overcome and adequate safeguards introduced against possible airlocks in the oil system, the visual means of drive of these essential portions of the mechanism appeals more strongly to the average sea-going engineer than the hydraulically operated type, in which the working parts are controlled by a medium enclosed in pipes.

Steam Turbines.

The year saw only one or two notable examples of high-powered turbine plants completed. The Washington, of the United States Lines, a sister ship to the Manhattan, the largest of the cabin class of ships plying the Atlantic, and the Queen of Bermuda, with a four-shaft turbo-electric drive installation by Messrs. Vickers-Armstrongs, entered their respective services. It may be noted, however, that several of the large vessels finished a year or two earlier have put up new remarkable performances. The Empress of Britain, of the Canadian Pacific Steamships, accomplished the best performance of her career on her usual Canadian run, while in June the Bremen did the eastbound Atlantic crossing from New York to Cherbourg at 28·14 knots, though this record was beaten by the Rex in August at 28·92 knots from New York to Gibraltar. Until the advent of the Normandie and the new Cunarder, the above figures are likely to stand, as it is only under remarkably favourable weather conditions, for which the past summer was notable, that five consecutive calm days in the Atlantic can be expected, while the fuel bill for the maintenance of the necessary high power continuously is very large.

The turbo-electric installation of the Queen of Bermuda has been stated to have given every satisfaction, and the continued good reports of the P. & O. liners Viceroy of India, Strathaird, and Strathnaver seem to indicate that at least as good reliability and durability—given skilled handling—may be expected from the turbo-

electric drive as has been already demonstrated by geared turbine installations of similar powers. A more direct comparison between the two systems will become available when the Normandie with turbo-electric drive and the new Cunarder with geared turbines go into commission. Incidentally, it was announced on December 13 that the Government would provide financial assistance for the completion of the latter vessel, work on which was suspended at the end of 1931.

Exhaust Steam Turbines.

The number of ships fitted with exhaust steam turbines was relatively small during the past year, although there was an appreciable increase, particularly towards the end of the year, in the number of inquiries received for these plants, both for conversion work and for application in conjunction with new reciprocating engines. The excellent results obtained from the Bauer-Wach system in the Norwegian-American liner Stavangerfjord decided the owners to convert their other transatlantic liner Bergensfjord, and the published results of the latter ship confirm the extremely satisfactory figures obtained in the earlier conversion. The system last year was utilised in Germany for a considerable number of conversions, and also for new vessels of the trawler type, and in a few in France and Japan. Among notable conversions ordered in this country was that of the Trojan Star, of the Blue Star Line.

The Ellerman Lines last year ordered the conversion of six of their ships to exhaust turbines; in these cases the additional power is being transmitted back to the propeller shaft electrically.

The Götaverken system (described in last year's review) was applied by Messrs. Rowan in a few new ships for the Harrison Line, and by Messrs. Hawthorn, Leslie and Co., in the Maplebank for Messrs. Joseph Constantine, and in the Gretafield, a large tanker with a quadruple engine, owned by Messrs. Hunters and Sons. The system, however, is inherently one for economy only and not for additional power, in contrast with those designs in which the power from the turbine is put back into the propeller shaft abaft the reciprocating engine. In it, as in the Lindholmen system, the power from the turbine is used to raise the pressure or temperature of the steam in its passage through the main engine, and an existing engine is, therefore, in general not suitable for any power increase without major modifications. Further, the extra power developed by the exhaust turbine is not capable of being applied to smooth out the torque fluctuations in the propeller shaft by flywheel effect, as is the case with those systems in which the turbine contribution to the total is added outside the reciprocator.

An installation of the White system was ordered for the Adderstone (*ex* Boswell), in which a three-turbine arrangement with double-reduction gear was originally fitted. The conversion consists in the removal of the high and intermediate-pressure turbines, the low-pressure turbine remaining and taking exhaust steam from a fast-running, forced-lubricated, poppet-valve engine connected to the

existing gearing through a specially designed flexible spring-controlled coupling.

Internal-Combustion Engines.

It was pointed out in last year's review that the production of internal-combustion engines in this country was extremely limited. During the last twelve months there was a distinct revival in the amount of work of this class in progress, and the horse-power figures of work under construction nearly trebled, although even so they were only one-half of those of 1931.

An interesting report on the service performance of the 12-cylinder trunk-piston type Harland and Wolff engines in the Reina del Pacifico was made public. The satisfactory results reported showed that the fears expressed in many quarters as to the possibility of operating fast-running trunk-piston engines successfully on continuous transatlantic passages have not been justified.

In Holland a number of conversions from steam to Diesel prime movers were put in hand. The plants were of moderate size, and the conversions were undertaken, in some cases with hull modifications also, for the purpose of obtaining an increase of power and speed to meet the growing demand for faster cargo transport. A conversion in the opposite direction, from oil to steam, was also announced during the year, the Royal Mail Lines, desirous of raising the speed of their large passenger ships Asturias and Alcantara, arranging with Messrs. Harland and Wolff to remove the existing double-acting Diesels and replace them by single-reduction steam turbines and water-tube boilers.

The Götaverken Company, who are responsible for the exhaust steam turbine design already mentioned, have also produced another combination consisting of a compressor driven by a Diesel engine the gas and air cylinders of which may be all co-linear on a common bedplate, the bulk of the air from the compressor being used to drive a reciprocating engine or turbine coupled to the propeller shaft. The principle is similar to the Diesel-electric drive, but air takes the place of electricity as the transmission medium. The speeds of the prime mover and the driven shafts can be entirely different, as is the case with Diesel, or turbo-electric drive.

Nearly all modern ships with Diesel engines are now fitted with some form of waste heat recovery, the products of combustion being utilised either in driving a supercharging turbo-blower or in raising steam for auxiliary and heating purposes in special waste-heat boilers, of which several types are available.

Cross-Channel Vessels.

The steam turbine with single-reduction gearing retains its popularity for cross-channel vessels. It was specified, for example, in the Brighton for the Newhaven-Dieppe service, and in the Brittany (in which the curious mixture of one Scotch and one Yarrow boiler is fitted) for the Channel Islands service, both completed by Messrs.

Denny, and also in the new Stranraer-Larne steamer ordered from the same builders, in the steamers ordered by the Great Western Railway and the Isle of Man Steam Packet Company from Messrs. Cammell Laird and Co., and in the three train-ferries for the Dover-Dunkirk route ordered from Messrs. Swan, Hunter, and Wigham Richardson. Turbines of the three-shaft direct-coupled type were, however, installed in the Queen Mary, a Clyde passenger steamer completed for Messrs. Williamson by Messrs. Denny. A paddle-boat ordered by the London, Midland, and Scottish Railway for their Clyde service from Messrs. Denny has diagonal engines of the usual triple-expansion type, as also has a similar vessel ordered from the Fairfield Company.

Good progress was made with the Sulzer engines for the Prince Baudouin under construction for the Dover-Ostend service by Messrs. Cockerill, but it is understood that the vessel will not be placed in commission until early this year. Burmeister and Wain two-stroke single-acting airless injection engines of 2,300 h.p. were fitted in the motor-car ferry Jylland, a sister ship of the Kalundborg completed by the Nakskov Yard for service across the Sound,

Technical Progress.

The year witnessed great progress, so far as hull work is concerned, in electric welding, and notable papers detailing developments were read before several of the professional societies. That the advances made will have their repercussions on the propelling equipment is undoubted, particularly so far as the framing for both Diesel and steam engines is concerned. Already auxiliary Diesel sets are built in which bases, columns, and crank cases, and even cylinder heads, are fabricated from steel plates and bars welded together, and the frames for main propelling motors and parts of turbine reduction gear cases manufactured in the same manner are becoming standard practice. In Germany the main bedplates and columns of small steam engines are now being successfully made in this way, with a reduction in weight and cost and elimination of the uncertainty always associated to a greater or less extent with the cast product.

Generally, technical progress has more than kept ahead of demands made for enhanced economy, but as previously mentioned, the opportunities for putting into actual practice the latest designs have been extremely limited. The majority of owners are content to let others carry out pioneering work, and but for the small minority who appreciate what is being done to augment the efficiency of marine propelling machinery and encourage manufacturers by their orders in the prosecution of this quest, the industry would be to-day in a much more parlous plight than it unfortunately is, and likely to remain until wastage by loss, scrapping, or obsolescence begin to stimulate a revival of demand for new tonnage, or at any rate, rejuvenation by some of the many devices now on the market.

R. J. Butler, M.Inst.N.A.

CHAPTER XVII.

NOTABLE MERCHANT SHIPS OF THE YEAR.

VERY few large passenger ships were built last year. The only one in the British Isles was the Queen of Bermuda, of 22,000 tons, and the few turned out abroad were mostly duplicates of earlier sisters, the Washington, for example, following the Manhattan, and the Oceania the Neptunia. The shipyards were mainly occupied with smaller but, generally, interesting vessels, and considerable ingenuity was displayed by designers and builders in catering for special services throughout the world. Their productions thus included the first two Diesel-electric tugs built in this country, the largest ocean salvage tug built in Holland, and the largest trawlers in France and Denmark, while Scandinavia was responsible for some interesting fruit carriers. Thus the output for 1933, although lacking spectacular events, such as the launch of the Normandie in 1932, provided some noteworthy contributions to the science of naval architecture and marine engineering.

PASSENGER LINERS.

The Queen of Bermuda, completed in February for the New York–Bermuda service of the Bermuda and West Indies Steamship Company, associated with Messrs. Furness, Withy & Co., is, in general plan and dimensions, a sister to the Monarch of Bermuda completed in November, 1931, for the same service. Both vessels were built by Messrs. Vickers-Armstrongs and have turbo-electric drive, the electrical gear being by the General Electric Company, the steam turbines by Messrs. Fraser & Chalmers, and the oil-fired water-tube boilers by Messrs. Babcock & Wilcox. The Queen of Bermuda was ordered to replace the motorship Bermuda, which was destroyed by fire, and, whereas the Monarch of Bermuda was built at Walker-on-Tyne, the Queen of Bermuda was built at Barrow-in-Furness. Compared with the 19,086 gross tons of the Bermuda, the Queen of Bermuda is of 22,424 gross tons, has an overall length of 579 ft. 6 in., an extreme breadth of 83 ft. 6 in., and a load draught of 26 ft. 3 in. She is propelled by four screws and has a speed of 19¼ knots. Externally, she is distinguished from her sister ship mainly by a series of orifices in the first two of her three funnels, the last of which is a dummy; their purpose is to throw the smoke upwards, clear of the decks. The enclosed superstructure deck extends rather farther aft, to shelter the swimming bath which is right aft on A deck. The Monarch of Bermuda was provided with two swimming baths,

one well down amidships, over the engine-room, and the other adjoining the large dancing space; but experience showed that the lower one was not used much, and a more elaborate single bath was consequently installed in the second ship, well aft and self-contained. In many respects it is novel. The shape is elliptical, and at each end there are vertical grids which act as baffles to the fore and aft motion of the water when the vessel is pitching. This arrangement has been found to overcome, very successfully, the disabilities often experienced at sea under unfavourable weather conditions.

The public rooms follow, in general, the layout of the Monarch of Bermuda, although the decorative schemes are entirely different. In both ships there is a bathroom to each state-room. The cargo arrangements are not alike, since the newer ship has, forward, an extra refrigerated hold, with its own refrigerating machinery. The kitchen arrangements have been improved by placing the ranges and other cooking apparatus fore and aft instead of athwartships, thus enabling the catering staff to have the full use of wide fore and aft corridors and greatly assisting the service. The accommodation is taken up almost entirely by the first-class passengers, of whom 731 can be carried. Alternatively forty second-class passengers can be carried in interchangeable accommodation aft. Exceptional precautions have been taken to guard against fire. The owners are understood to have spent £19,000 on the Monarch of Bermuda over and above the statutory fire regulations, but in the case of the Queen of Bermuda they went even farther and spent £25,000 more than was essential. Fire-resisting treatment of wood, fire-resisting paints, and an extensive series of fire alarms in all cabins and cargo and other spaces, form part of the exceptional measures. The lay-out of the engine-room is an improvement on that of the sister ship, since the lower swimming bath of the Monarch of Bermuda cramped her engine-room and the designers had a freer hand in the second vessel.

The motorship Malaita, built by Messrs. Barclay, Curle & Co., Glasgow, for Messrs. Burns, Philp & Co., Sydney, N.S.W., is an interesting vessel intended for the coastal trade of Australia and outlying districts. She is 325 ft. long with a moulded breadth of 47 ft. and a draught of 20 ft. 9 in. Accommodation is provided for about 100 passengers, and was enlarged during construction on account of improved trading conditions in Australia. The vessel is propelled by the first two-stroke single-acting airless injection trunk-piston type of Burmeister and Wain-Diesel engine built in this country, the constructors being Messrs. J. G. Kincaid & Co., Greenock. The machinery develops in service 1,740 b.h.p. at 110 r.p.m., but is capable of maintaining an output 20 per cent. greater if required. The service speed is 12 knots.

The Hamburg-Amerika Line have followed up, on their service between Europe and the West Indies and Central America, the two motorships Orinoco and Magdalena with two larger vessels. These are the Caribia and Cordillera, motorships about 524 ft. long and 65 ft. 6 in. beam, and of about 12,000 gross tons, or about 2,500 tons more than the earlier ships. The Caribia entered service in the early

spring, and her sister followed later in the year. Both ships were built by Messrs. Blohm & Voss at Hamburg, and are engined by two sets of M.A.N. eight-cylinder double-acting Diesel engines developing about 12,500 b.h.p. These give a speed of 17 knots. The public rooms are exceptionally light and airy, free use having been made of French windows opening on the deck and of large skylights which, in the tropics, can be lifted so as to open the rooms to the heavens. This arrangement gives an exceptionally agreeable tea room and dance hall, the effect of which is enhanced by the cool appearance of the tiled floor, the central fountain and the liberal distribution of alcoves surrounding the dancing space. The dining saloon is lofty, extending through two decks, the upper gallery also opening out on the deck by means of French windows. In these vessels, as in some of the earlier German steamships, the designers have adopted the system of divided uptakes. The procedure is, of course, simpler in the case of motorships, and by placing all the public rooms on one level (including the balcony of the dining saloon) on the promenade deck an exceptional effect of spaciousness has been attained. Altogether there is accommodation for 170 first, 105 second, and 110 tourist class passengers. There is an open-air swimming bath just aft of the tea room.

The long series of large passenger liners of the Italian programme, which included the steamships Rex and Conte di Savoia and the motorships Saturnia, Vulcania, Neptunia, and Oceania, came to an end last year with the completion of the last named at the Monfalcone yard of the Cantieri Riuniti dell' Adriatico for the Cosulich Line. She is a quadruple screw vessel, designed for pleasure cruising in the summer and to take her place in the winter on the owners' regular service between Trieste, Naples, and South America. In dimensions she is similar to the Neptunia built the previous year—about 590 ft. long overall, with a moulded breadth of 76 ft. 6 in., a depth to A deck of 53 ft. 8 in., and a load draught of 27 ft. 6 in. on a displacement of about 20,000 tons. In general appearances, also, she is almost identical, with her single peculiar elliptical and semi-conical funnel, a well raked stem and a cruiser stern, but she has many differences. Extra precautions against fire have been adopted. For example, in order to limit the risk from short circuiting, the electric cables have been specially insulated, and the use of varnish has been abandoned in favour of a special silicon compound. Metal has been largely used in the public rooms and cabins, the timber has been fire-proofed as far as practicable, and a special series of fire-proof doors has been installed. Altogether the Oceania carries about 200 cabin-class and 1,400 third-class passengers, and the cargo holds, of a total capacity of 353,000 cu. ft., have 71,500 cu. ft. insulated. There are four eight-cylinder Fiat engines of the two-stroke cycle air-injection type, each cylinder having a diameter of 750 mm. with a stroke of 1,000 mm. On test they developed 6,678 b.h.p. at 140 r.m.p.

Very few ships were built in American shipyards. The most noteworthy was the Washington, a sister to the Manhattan, described last year, and, like her, a large cabin-class transatlantic liner for the

New York–European service built on luxury lines with a speed of about 20 knots on service. She is 705 ft. long and 86 ft. in moulded breadth, with a gross tonnage of 24,290. There is accommodation for 575 cabin class, 365 tourist class, and 141 third-class passengers. Most of it is interchangeable for seasonal requirements and cruising; in other words, the standard of the so-called inferior classes is nearly as high as, at least, the minimum rate of the superior classes. As an example, it may be stated that 72 per cent. of the state-rooms in the cabin class have private toilet facilities, as have 40 per cent. of the tourist class. An unusual feature is the employment of ½ in. cork tile as a deck base in the state-rooms and other interior spaces, with an estimated saving of about 200 tons weight. The machinery is practically a duplicate of that of the Manhattan, with Parsons single-reduction geared turbines taking steam from six Babcock & Wilcox water-tube boilers.

The Forges et Chantiers de la Méditerranée built at their La Seyne yard the twin-screw passenger and cargo steamer El Mansour for the Marseilles–Algeria service of the Cie de Navigation Mixte. A vessel 400 ft. long and of 5,100 gross tons, she carries 380 passengers, of whom 112 are first, 142 second, and 126 third class. There is also provision in the 'tween decks for emigrants or troops. Particular attention has been paid to the fire-proofing of the accommodation. The staircases are entirely of metal, and an electric fire detecting device has been installed in the cargo spaces. The propelling machinery consists of Parsons single-reduction geared turbines developing about 12,000 h.p. and using steam from four water-tube boilers burning oil fuel. The speed is about 22 knots. The vessel has a distinctive appearance, with two short elliptical funnels, well balanced on a long superstructure with rounded bridge front.

The Maréchal Joffre, the seventh motorship for the Messageries Maritimes, was built at La Ciotat yard of the Société Provençale de Constructions Navals. She is employed on the Madagascar-Indian Ocean service, and was followed later in the year by the President Doumer, which is to be completed during 1934. The Maréchal Joffre is 493 ft. long, with a beam of 64 ft., a mean draught of 26 ft., and a displacement of 14,820 tons. She bears the characteristic square funnels of this company's motorships. There is accommodation for nine passengers in de luxe suites, 127 first class, 92 second class, and 74 third class, with 580 pilgrims in the 'tween deck spaces. The equipment includes a special sewage disposal system by ejection. The propelling machinery consists of two Burmeister & Wain four-stroke cycle single-acting heavy oil engines each developing 3,400 b.h.p. at 110 r.p.m. They were built at Le Creusôt works of Schneider et Cie.

The Bombay Steam Navigation Company, which maintains ten different services that radiate all the way from Bombay and Karachi in one direction and Bombay and Goa in the other, took delivery from the Govan shipyard of Messrs. Harland & Wolff of the Prabhavati and Chandravati. They are twin-screw light-draught vessels, 199 ft. long with a moulded breadth of 34 ft. and a depth moulded to shade deck of 18 ft. 9 in., and accommodation for about 700

passengers. Propulsion is by triple-expansion engines with Scotch boilers burning either coal or oil.

The Melanesian Mission replaced the Southern Cross, lost on her maiden voyage in 1932, with a new Southern Cross built and engined by Messrs. Cammell Laird & Co. as an improved form of her unfortunate sister. The new vessel, which left England in September to take up duty in the Melanesian Islands, is 120 ft. long, and on account of the peculiar nature of her service embodies several novel features, including separate day and night cabins for the Bishop and an arrangement whereby the saloon, which adjoins his quarters, can be converted to a chapel, the altar being concealed by folding doors when the room is used as a saloon. Propulsion is by two sets of Gardner Diesel engines giving a speed of about 9½ knots.

A luxurious motor-yacht, the Trenora, was built at Woolston by Messrs. John I. Thornycroft & Co., for Mr. Gerald Stanley, Paris. Of 820 tons Thames measurement and 210 ft. long overall, she is the largest motor-yacht built in Europe last year. She has a typical motorship appearance with her one squat funnel, which, however, is painted black and thus shows up strongly against the white hull.

Cargo Ships.

The Port Chalmers, which Messrs. Swan, Hunter & Wigham Richardson, Wallsend-on-Tyne, built for the Commonwealth and Dominion Line's service to New Zealand and Australia, has accommodation for 12 first-class passengers, but is mainly designed for the carriage of refrigerated cargoes, dairy produce, and fruit. She is about 486 ft. long with a gross tonnage of 8,800 tons and a carrying capacity of 11,500 tons. She has been built to develop the chilled beef trade from New Zealand, experiments by this company with the motorship Port Fairy, built in 1928, having shown the practicability of bringing this cargo successfully across with the aid of carbon dioxide. On the new vessel, in addition to a comprehensive series of cargo-handling appliances, there is a derrick at the foremast for lifting up to 55 tons. The propelling machinery consists of two Barclay Curle-Doxford opposed-piston Diesel engines, built at Whiteinch, and capable of giving about 15½ knots in service.

An interesting type of ship was built by the Caledon Shipbuilding and Engineering Company, Dundee, for the Colonial Sugar Refining Company, Australia. She is noteworthy for having been handed over to her owners within six months of laying the keel, although she was mostly constructed during the winter and no overtime was worked. The Fiona, as she was named, is 285 ft. long and 44 ft. in beam, and carries 3,500 tons on a draught of 20 ft. 6 in. She has been specially constructed for the sugar and bulk molasses trade between Fiji and Sydney, the molasses being carried in topside wing tanks and transverse tanks under the main deck. For ballasting, there is a cellular double bottom, all fore and aft. There are three holds for general cargo. The molasses tanks hold about 2,000 tons, and the holds are so arranged with these topside tanks that the

vessel when carrying a coal cargo is, to all intents and purposes, a self-trimming collier. Arrangements are made for the discharge of the molasses at the rate of 40–60 tons an hour, and among the cargo handling gear on deck there are grabs for the discharge of coal. The propelling machinery consists of a single triple-expansion steam engine with independent auxiliaries built by the North Eastern Marine Engineering Company, Wallsend-on-Tyne. The working pressure of the two Scotch boilers is 200 lb. per sq. in., the steam being superheated to 620 deg. F. On trials a mean speed of 12·5 knots was reached, and on a consumption trial from Middlesbrough to Dover it was found that she steamed 10¾ knots on 12 tons of coal a day.

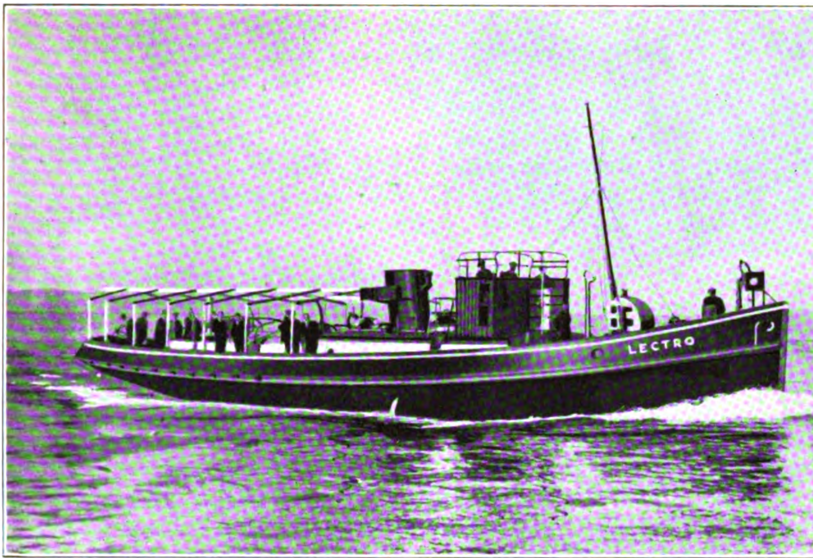
The Isipingo, the first of three motor passenger and cargo vessels under construction by Messrs. Workman Clark at Belfast for Messrs. Andrew Weir & Co., was launched in October. She is for the owners' service between India and South Africa, and is 425 ft. long with a breadth of 57 ft. and a depth of 37 ft. There is accommodation for first, second, and third-class passengers, a special feature being the provision of extensive promenade and open-air spaces for games. The ships have large holds for general and refrigerated cargoes. The propelling machinery consists in each case of two Workman Clark-Sulzer Diesel engines, giving a service speed of 15 knots.

The Arcwear, the first of three ships building to Sir Joseph Isherwood's new "Arcform" design, was launched on November 2, from the shipyard of Messrs. Short Bros., Sunderland. There are two others, the Arcgow, building by Messrs. Lithgows at Port Glasgow, and the Arctees, at the Haverton Hill yard of the Furness Shipbuilding Company. They will be completed early in 1934 and it is estimated that they will steam 9 knots on 11½ tons of coal a day, 10 knots on 16 tons, and 11 knots on 21 tons. They are about 360 ft. long and have a deadweight of 7,000 tons or about 22 ft. 7 in. They are propelled by triple-expansion steam engines supplied with superheated steam.

Tug Boats.

The Zwarte Zee, built to replace another famous salvage tug of the same name, was built at Smits Machinefabrieken, Kinderdijk, for Smit & Co.'s Internationale Sleepdienst, Rotterdam. She is about 194 ft. long with a breadth of 29 ft. 9 in. and a moulded depth of 16 ft. 9 in. She has one squat funnel, and her appearance is very different from that of the orthodox steam salvage tug. She has two Werkspoor Diesel engines of 4,200 aggregate horse-power, which are coupled to a single shaft by means of the Vulcan hydraulic gear constructed by the Deschimag. Her sea speed is 17½ knots, and, besides being claimed to be the most powerful tug afloat, she can make a trip round the world without calling for bunkers. She will be stationed at Brest during the winter in connection with the company's Atlantic salvage service.

British tug-boat owners have been slow in adopting Diesel-electric propulsion, although American tugs have used it successfully for some time. Curiously enough, the first two British-built Diesel-



THE UNION LIGHTERAGE COMPANY'S DIESEL-ELECTRIC TUG LECTRO.

(*Builders, Messrs. Henry Robb, Limited, Leith.*)

THE MOTOR SALVAGE TUG ZWARTE ZEE.

(*Builders, Smits Machinefabrieken, Kinderdijk.*)

electric tugs were completed within a few weeks of one another. The first, and largest, was the sea-going tug Acklam Cross for the Tees service of Messrs. Robinson & Crosthwaite, managing owners of the Tees Towing Company, Middlesbrough. The hull was built by Messrs. Hall, Russell & Co. at Aberdeen, the electrical equipment by the General Electric Company, and the Diesel engines by Messrs. Peter Brotherhood, Peterborough. The overall length is 98 ft., the breadth 22 ft., and the depth 11 ft. 6 in. There are two Brotherhood-Ricardo six-cylinder engines, each capable of developing 300 b.h.p. at 900 r.p.m., and the electrical equipment consists of a 500 h.p. double-armature d.c. propulsion motor, supplied from two generators. There are four control stations, two in the wheel-house and two on the flying bridge. The main engines are electrically started by a push-button, two batteries being provided for this and auxiliary lighting and other services by the Chloride Electrical Storage Company. This system of starting is in lieu of the usual compressed air bottles, and it is said that the Acklam Cross is the first electrically propelled vessel to start with a push button.

The second Diesel-electric tug, the Lectro, is for service on the Thames, and is the first of this type to be employed on London River. She is a smaller vessel than the Acklam Cross, being 92 ft. long, 22 ft. in beam, and 11 ft. 6 in. in moulded depth. As she will be mainly employed in towing petrol barges from Shell Haven to Fulham, and has to pass under many bridges, her maximum height above the water line has been kept down to 13 ft. She was built for the Union Lighterage Company, London, by Messrs. Henry Robb, Leith, and the motive power consists of two sets of six-cylinder airless-injection Diesel engines by Messrs. Mirrlees, Bickerton & Day, Stockport, each developing 360 b.h.p. at 300 r.p.m. The electrical plant was supplied by the British Thomson-Houston Company. Two main generators feed a propulsion motor which develops 580 s.h.p. at 120 r.p.m. and 150 r.p.m., the arrangement being such that full power is developed at the slower speed when towing and at the higher when running free. As with the Acklam Cross, there is bridge control. The equipment includes a special salvage pump capable of delivering sea water at the rate of 90 tons an hour against a head of 100 ft. There is also a smaller pump with a capacity of 20 tons an hour capacity against a head of 50 ft.

A motor tug, the Aboma, built by Messrs. Cochrane & Sons at Selby for Messrs. Gaselee & Son, London, is 70 ft. long with a moulded breadth of 17 ft. and a moulded depth of 8 ft. 6 in. She is reserved mainly for towing dumb barges on the Thames, and, for use on the upper reaches, has low superstructure with lowering mast and funnel. The engine is a six-cylinder "Atlas Polar" type built at the Govan works of British Auxiliaries, Limited, and installed by Messrs. Plenty & Sons, Newbury. It develops 390 b.h.p. at 300 r.p.m.

The Corliss, a 52 ft. Diesel-engined tug, built by Messrs. Harland & Wolff at North Woolwich for Messrs. Wm. Cory & Son, is designed for canal work, and consequently has the limited draught of 4 ft. 6 in., with a maximum overall height above the load water line of 5 ft. 6 in.

Special Dalzo rust-resisting steel was used for the hull because of the corrosive action of the waters in which she operates. She is propelled by a four-cylinder Petter Atomic Diesel engine developing 100 b.h.p. at 400 r.p.m. Exceptionally large air reservoirs have been installed because of the nature of the service, and the air supply is ample for repeated starting and stopping for more than half an hour. A salvage pump which will deliver 60 tons of water an hour can also be used as a suction pump for salvage, as a bilge pump, or as an auxiliary pump for cooling water for the main engines. On account of the restricted head room the exhaust silencer is placed athwartships below the after deck and the piping then leads aft, coming out through the bulwarks at the stern. The silencer is water-cooled.

What is claimed to be one of the most powerful dredgers afloat was turned out from the Dunkirk yard of the Ateliers et Chantiers de France for service at Boulogne-sur-Mer. The Pas de Calais II is 236 ft. long overall, and an exceptional feature is that the bucket ladder can operate to a depth of nearly 76 ft. The dredging capacity is about 21,000 cu. ft. an hour. There are two screws, driven by double compound engines of the Christiansen & Meyer type, with steam from two boilers of the Prudhon-Capus type, working at 200 lb. per sq. in. and burning pulverised coal on the Stein system with an alternative oil burning installation, which is also used for starting up the pulverised coal burners.

Fruit Carriers.

Typical among a number of fruit carriers built in Scandinavian shipyards are the Breñas, Betancuria, Washington Express, and Oregon Express. The first two were built by Akers Mek. Verksted, Oslo, for Messrs. Fred Olsen & Co. of the same city. They are about 355 ft. long and have a deadweight of 3,300 tons. Propulsion is by Burmeister & Wain six-cylinder single-acting Diesel engines developing about 6,000 h.p. and giving a service speed of 16½ knots. They are engaged in the Canary Islands trade. The "Express" class are intended to deliver fresh fruit in Europe within 25 days of leaving the Pacific Coast, and to do so will have to maintain a speed of about 17 knots. They were built at the Odense shipyard, Denmark, for Mr. Sigurd Herlofsen, Oslo, and are 350 ft. long, carrying about 3,000 tons. They are propelled by Eriksberg-Burmeister & Wain Diesel engines, and have accommodation for a few passengers.

The first ship to be built in Denmark to Maier form was launched from the Nakskov Shipyard in October. This was the Jonna, for Mr. J. Lauritzen, Copenhagen, and is also a fruit carrier. She is 260 ft. long and has a carrying capacity of about 2,500 tons. All the cargo holds are insulated. The propelling machinery consists of a Lentz steam engine with exhaust steam turbine, and develops about 1,250 i.h.p. In the same month there was completed at the same yard for the same owner the Laura of similar size and also equipped for the fruit trade. In appearance and general design, however, she is dissimilar, being built as a general cargo steamer, with main deck forecastle, long bridge, and poop with cruiser stern. The

rudder and stern post are stream-lined, and with machinery similar to that of the Jonna and a bronze propeller she made 13¾ knots on trials.

The twin-screw motorship, Duca Degli Abruzzi, built at the Eriksbergs Shipyard, Gothenburg, for the S.A. di Nav. Italo-Somala, Genoa, for the banana trade from Somaliland, was the first of three, two of which were completed and one launched during the year. Vessels 296 ft. long, they are propelled by two Eriksberg-Burmeister & Wain Diesel engines which give a speed of 15½ knots. The second ship was the Capitano Bottego, and the third, launched in October, was the Capitano A. Cecchi. There is accommodation for twelve passengers.

The Kolenté, built at the Port de Bouc yard of the Chantiers et Ateliers de Provence for the Cie des Transports Maritimes de l'Afrique Occidentale Française, has the distinction of being the first French-built banana carrier, and is for service between Konakry on the West Coast of Africa and Nantes and Bordeaux. She is 344 ft. long, 48 ft. 6 in. broad moulded, and 18 ft. in draught. On a displacement of 4,800 tons she has a deadweight of 1,800 tons of cargo. The special fruit holds are arranged for about 900 tons of bananas. All are insulated, and there is a special cooling and heating ventilation system by Thermotank fans capable of circulating 6,000,000 cu. ft. of air an hour. There is accommodation in single-berth cabins for ten passengers. Propulsion is by means of a single set of triple-expansion engines taking superheated steam from Prudhon-Capus boilers. The power of 3,500 i.h.p. gives the vessel a speed of 14·5 knots. The Kolenté was followed by a sister ship later in the year.

Channel Vessels.

The Southern Railway put on the Newhaven-Dieppe service the twin-screw cross-channel steamer Brighton, built and engined by Messrs. William Denny & Bros. at Dumbarton. This service calls for a speed of about 25 knots in all weathers, and the ships are probably the fastest cross-channel steamers in the world. The draught is limited to 10 ft., and the Brighton, which is the largest of the six ships employed in the service, and has a length of 306 ft., represents practically the limits of size for Dieppe harbour. She has a Board of Trade certificate for 570 first, 680 second, and 200 third class, and in general design follows the Worthing, built at Dumbarton in 1928. She is equipped for both day and night service, and the promenade spaces are well screened by large plate glass windows, following modern cross-channel practice. The propelling machinery consists of twin-screw single-reduction turbines taking saturated steam from four Yarrow water-tube boilers at a pressure of 250 lb. per sq. in. and burning oil fuel under Howden forced draught.

A Southern Railway contribution to the Channel Islands service last year was the Brittany, used mainly on the short service between Jersey (St. Helier) and St. Malo. Carrying about 850

passengers, she is a two-masted single-funnelled ship, and was built by Messrs. Denny at Dumbarton. The first-class passengers have a large dining saloon on the promenade deck and a general lounge on the main deck. There are separate ladies' and gentlemen's lounges on the lower deck, both fitted with sleeping berths. There are also some two-berth private cabins on the main deck, which are provided with settee berths. There are no upper berths, and hot and cold running water is supplied. The Brittany is 260 ft. long overall, with a gross tonnage of 1,445 tons. She is propelled by two sets of Parsons single-reduction geared turbines, steam being supplied by one Yarrow water-tube and one Scotch boiler, burning oil fuel. The speed at 210 r.p.m. is 16½ knots.

The second of the cross-channel steamers operated between Calais and Dover by the S.A.G.A. (Soc. Anon. de Gérance et d'Armement) to replace the Invicta and Empress entered service last May. She is the Côte d'Argent, almost identical with the Côte d'Azur which went in service on 1931. Both ships were built by the Forges et Chantiers de la Méditerranée. They are 338 ft. long and 45 ft. in beam, and displace about 2,580 tons at 12 ft. draught. About 1,400 passengers can be accommodated, and the vessels both adopt the modern cross-channel style of large enclosed promenade spaces with Pullman seats and luggage racks for small baggage. Propulsion is by two sets of Parsons single-reduction geared turbines, steam being provided by Babcock & Wilcox water-tube boilers working at a pressure of 256 lb. per sq. in., compared with 242 lb. in the earlier sister ship.

A new service between the Channel Islands and London was met by the construction at the Burntisland Shipyard of a coasting type of vessel, the London Queen, for the London and Channel Islands Steam Ship Company. She is 195 ft. long between perpendiculars, has a moulded breadth of 30 ft. 9 in., and carries 1,160 tons deadweight on a draught of 14 ft. 6 in. Propulsion is by means of a triple-expansion engine built by Messrs. David Rowan & Co., Glasgow, deriving steam from a Scotch boiler working at 200 lb. per sq. in. The service speed is 10 knots, but on trials she made 11 knots in the loaded condition, the engines developing 660 i.h.p. at this speed. The London Queen is of the raised quarter-deck type with topgallant forecastle. The machinery is aft, and there are two large holds with hatches 34 ft. by 16 ft. Each hatch is served by two steel derricks, one of three tons and the other six tons working load. Everything is arranged to effect speedy loading and discharging, and special arrangements have been made for deck cargoes which are a feature of this trade. The peculiar nature of the service has also involved the introduction of the bar type of keel, with additional strengthening of the bottom.

Two cargo motorships put on the Tilbury-Ostend service maintained by the Soc. Anon John Cockerill, are the Améthyste and Turquoise, which were built at the Seraing shipyard of the owners. They have been designed for a special trade in fruit, vegetables, and butter for the London early morning market, and have consequently the relatively high speed of 13 knots. They are 190 ft. long, with a

service draught of 9 ft. 6 in., and a deadweight of 278 tons on 950 tons displacement. There is special space in the forecastle for the carriage of live poultry. The vessels are propelled each by two Burmeister & Wain 4-stroke single-acting trunk-piston Diesel engines also built at Seraing. Each engine develops 600 b.h.p. at 225 r.p.m.

Fishing Boats.

The Bayflower was the first of a series of modern trawlers built by Messrs. Cochrane & Sons at Selby for service in Iceland, Bear Island, and the White Sea. They are 163 ft. long with a moulded breadth of 25 ft. 6 in. and a moulded depth of 14 ft. 6 in. They have a full cruiser stern, and welding was largely used in their construction. Special provision is made for storing the fish in insulated chambers, and there are special liver boilers in a deck house. Propulsion is by triple-expansion steam engines which, on trials, gave a mean speed of 12¼ knots.

At the time of her completion last spring at the Grand Quévilly shipyard of the Soc. des Chantiers et Ateliers de St. Nazaire Penhoët near Rouen, the Marcella could claim to be the largest trawler in the world, but later she had to concede the honour to the Jutland built at the Frederikshavn yard. The Marcella is a Diesel-engined trawler propelled by a six-cylinder four-stroke cycle single-acting engine of the Burmeister & Wain type, built at Penhoët and developing normally 1,000 h.p. at 150 r.p.m., but specially designed for operating at 50 r.p.m. during trawling operations. At 160 r.p.m. on trials she did 11·65 knots. She was built to the order of the Soc. Nouvelle des Pécheries à Vapeur of Arcachon, is 207 ft. long, and carries about 1,265 tons on a load displacement of 2,340 tons. Fresh water and fuel can be carried in sufficient quantities to enable her to stay on the trawling grounds for four or five months. The Jutland is for M. Joseph Huret & Co., Bordeaux, and is propelled by a six-cylinder four-stroke Burmeister and Wain engine developihg 1,000 h.p. at 160 r.p.m.

Smith's Dock Company, South Bank on Tees, were engaged on a series of ten trawlers for Consolidated Fisheries, Grimsby. They are for the Iceland fishing grounds, and can be recognised by being named after football teams, such as Arsenal and Aston Villa. They are 155 ft. long, and have a special type of cruiser stern evolved by the builders. A great deal of electric welding was used in their construction. A triple-expansion engine with superheated steam gives a speed of about 11¾ knots.

A.M.I.N.A.

CHAPTER XVIII.

Marine Aviation.

The Coastal Area is the division of the Royal Air Force which has succeeded the old Royal Naval Air Service and which now deals with all marine aircraft in the Service. It covers (*a*) the Fleet Air Arm, and (*b*) Coast Defence aircraft, and in both of these subdivisions some notable changes have taken place since the last issue of "Brassey."

The Fleet Air Arm is organised on somewhat unusual lines. It comprises only those aircraft and their personnel which are carried in warships. In multi-seater machines the observer is invariably a naval officer, and in three-seater spotter-reconnaissance machines the telegraphist air gunner is always a naval rating. Of the pilots in the Fleet Air Arm 25 per cent. are officers of the Royal Air Force, while the remaining 75 per cent. are naval officers holding temporary commissions in the Royal Air Force. The riggers and fitters who look after the machines are airmen (i.e. other ranks of the Royal Air Force). While on board ship all are under the control of the naval authorities for operational duties, though on each aircraft carrier there is a wing commander of the R.A.F. who is in charge of flying and acts as adviser to the captain of the ship in all flying matters.

During the past year the units which are taken on board carriers were reorganised. The old organisation consisted of flights, each of which had an establishment of six aircraft, though it usually operated with five. These flights have now been reorganised into squadrons, of which the normal establishment is twelve aircraft, though they usually work as three flights of three machines each. As a considerable measure of re-equipment has been carried out at the same time as the reorganisation into squadrons, all the units are not at the moment of writing completely up to strength. There are twelve of these squadrons, arranged in three groups. Nos. 800, 801, 802, 803 are all equipped with fighter machines, either single-seaters or two-seaters. Nos. 810, 811, 812 fly torpedo-bomber aircraft, while Nos. 820, 821, 822, 823, 824 have spotter-reconnaissance types. All the aeroplanes are of the class known as ship-planes. That is to say, they have wheeled undercarriages, but have been specially designed or modified to meet the conditions of landing on the decks of aircraft carriers, and for the general requirements of naval work. For instance, reconnaissance landplanes are always two-seaters, but in the Fleet Air Arm reconnaissance ship-planes are usually three-seaters.

There is a school of thought which holds that carriers are vulnerable, because a single bomb dropped on the flying deck would probably prevent machines from taking off and landing. This school holds it to be unwise to concentrate all the aircraft which would provide the eyes of the fleet in one vulnerable vessel. Moreover, a single cruiser or capital ship might have need of air reconnaissance or air defence when there was no carrier within reach. For one or both of these reasons it has been decided to proceed with the provision of aircraft for cruisers and capital ships. This has been made possible by the recent development of the catapult, which will launch an aircraft into the air at flying speed. It will, of course, be impossible for such an aircraft when returning from its mission to alight on the deck of a cruiser or capital ship, and so it is necessary that these machines should be seaplanes. On their return they will alight in the sea beside their parent ships and be hauled aboard by cranes. This may be a difficult feat in a very rough sea, but in war time risks must be run which would be inadvisable in time of peace, and a ship which has an aeroplane on board is in a stronger position than one which is without such a weapon. These catapult seaplanes have to be of very sturdy construction, not only to stand up to the stresses of the catapult launching, but also because they are stored on the catapult when not in use, and have to withstand the weather and the salt spray.

There are, consequently, six flights of the Fleet Air Arm which provide seaplanes for cruiser squadrons. In all cases the pilots of these seaplanes are naval officers with temporary commissions in the R.A.F. No. 403 (Fleet Fighter) Flight provides aircraft for the 5th Cruiser Squadron on the China Station, No. 406 (F.F.) Flight for the 4th Cruiser Squadron in the East Indies, No. 407 (F.F.) Flight for the 2nd Cruiser Squadron of the Home Fleet, No. 443 (Fleet Spotter Reconnaissance) Flight for the 6th and 8th Cruiser Squadrons in America and West Indies and in South Africa, No. 444 (Fleet S.R.) Flight for the capital ships of the Home Fleet, and No. 447 (Fleet S.R.) Flight for the Mediterranean. This last-named Flight is stationed at Hal Far in Malta.

The equipment of the squadrons and flights is in a state of transition. In some cases old types remain, in others there is complete re-equipment with new types, and in others there are some old and some new types. Probably by the end of the year only the new types will be in use. In No. 800 Squadron, now in the Courageous, two flights have the Hawker "Nimrod" and one flight the Hawker "Osprey." Both these are new types, and both are driven by Rolls-Royce "Kestrel" engines, though of different marks and power. The "Nimrod" is a single-seater fighter, while the "Osprey" is a two-seater known as a fighter-reconnaissance machine. It is thought that it may be an advantage to have a percentage of machines in a fighter squadron which have a rear gunner with a swivelling gun, for the single-seaters can attack only by aiming the whole machine, which may be inconvenient when attacking targets on the surface, and they are defenceless against an attack from the rear. No. 802 in the Glorious is similarly

equipped. No. 803 Squadron in the Eagle in the Far East is entirely equipped with "Ospreys." The ship-plane "Osprey," which is constructed of rustless steel tubing, has a maximum speed of 175 m.p.h. at 3,000 ft., but this is considerably reduced when carrying full Service load. The "Kestrel" engine is moderately supercharged. The "Nimrod" has a fully supercharged "Kestrel," and the top speed of the machine is 192 m.p.h., but this too is considerably reduced when carrying full Service load. No. 801 Squadron in H.M.S. Furious is at the time of writing in the transition stage. It too has one flight of "Ospreys," but its single-seater flights have the out-of-date "Flycatcher."

The three torpedo-bomber squadrons, Nos. 810, 811, 812, are still equipped with the Blackburn machines "Ripon" and "Dart," each driven by a Napier 530 h.p. "Lion" engine. Both types are obsolescent, the "Dart" in particular being of quite ancient design. The Blackburn firm have produced a new torpedo-bomber type known as the "Baffin" with a Bristol air-cooled "Pegasus" engine, which has been approved by the Air Ministry but has not yet been issued to the Fleet Air Arm.

The five Spotter Reconnaissance squadrons, Nos. 820, 821, 822, 823, 824, are soon to be equipped throughout with the Fairey "Seal," but the first two alone have yet received that type, while the others still carry on with the Fairy III F. So far as the fuselage, or body, of these two types goes, there is not much difference between them, but whereas the old III F. has the water-cooled Napier "Lion" engine, the "Seal" has the air-cooled Armstrong-Siddeley "Panther."

The equipment of the flights which provide the catapult seaplanes is not very different from that of the squadrons, allowing for the difference between ship-planes and float-planes. The China fighter flight, No. 403, has the "Flycatcher," and so has the East Indies flight, No. 406, but No. 407 Flight, with the Home Fleet, has the "Osprey." The three spotter reconnaissance flights, Nos. 443, 444, 447, all have the Fairey III F. All except No. 407 should shortly be re-equipped.

The Coast Defence squadrons are of two classes, flying boats and torpedo-bombers. To take the flying boat squadrons first, there are four stationed in this country and three overseas. The Home squadrons are: No. 201 (Flying Boat) Squadron at Calshot, equipped with the Supermarine "Southampton" with two Napier "Lion" engines; No. 204 (F.B.) Squadron at Mount Batten (Plymouth) with "Southamptons"; No. 209 (F.B.) Squadron, also at Mount Batten, with the Blackburn "Iris" with three Rolls-Royce 825 h.p. "Buzzard" engines; and No. 210 (F.B.) Squadron at Pembroke Dock with "Southamptons."

The oversea squadrons are: No. 202 (F.B.) Squadron at Malta, "temporarily" equipped with Fairey III F. float-planes; No. 203 at Basra (Iraq) with Short "Rangoons" with three Bristol "Jupiter" air-cooled engines; and No. 205 at Singapore with "Southamptons."

The Air Ministry, after exhaustive trials with various types, has

THE VICKERS SUPERMARINE FLYING-BOAT "SCAPA."

(Builders, The Supermarine Aviation Works, Southampton.)

(By courtesy of "Flight.")

just selected three new types with which to equip some of these squadrons. The "Southampton" has been a splendid boat, and when new was well ahead of all other Service flying boats in the world, but that was a number of years ago. Replacement is already overdue. The "Rangoon" has also given satisfaction for a number of years. The first of the new types is the Blackburn "Perth," which has been developed from the "Iris" and is on the same lines but considerably improved. It also has three "Buzzard" engines, and a novel feature of the boat is a quick-firing gun in the bow which fires a 1½-in. shell. This type is to be given to No. 209 (F.B.) Squadron in place of the "Iris" which it now has. This squadron is under orders to go to Malta to relieve No. 202, so that for the first time there will be a squadron of long-range aircraft in the Mediterranean. A new Short boat, named the "Singapore III" with four Rolls-Royce "Kestrel" engines mounted in two nacelles, a pusher and a tractor in each, is to be given to No. 210 (F.B.) Squadron at Pembroke Dock. A new Supermarine boat, named the "Scapa," with two "Kestrels" mounted just under the upper planes, has also been ordered, and it is believed that this type will be given to No. 201 (F.B.) Squadron at Calshot, and possibly to another squadron.

No. 202 (F.B.) Squadron is under orders to return home from Malta on relief by No. 209. Presumably it will go to Mount Batten. It may be taken as certain that it will speedily receive some type of flying boat in place of its float-planes, but what type will be given to it has not yet been decided.

Only two squadrons are equipped with torpedo-planes. No. 36 (Torpedo-Bomber) Squadron is equipped with the Hawker "Horsley" with Rolls-Royce 650 h.p. "Condor" engine, and is stationed at Singapore. No. 100 (Bomber) Squadron, which has not yet been allowed to take the title "torpedo-bomber," was towards the end of the year sent out to Singapore. Its previous station was Donibristle in Fife. This squadron is equipped with the Vickers "Vildebeeste" with "Pegasus" engine.

The Blackburn "Perth."

The Blackburn Aeroplane and Motor Company produced its first flying boat in 1926. This was known as the "Iris," and like other flying boats of those days was built mainly of wood, the only exception being the wing fittings and a few struts, etc. A feature of the first Blackburn flying boat hull was the very deep vee bottom, which was designed to lessen shock on alighting. This feature has been retained, with minor modifications, in all subsequent Blackburn boats, and is to be found in the latest type of the "Iris" family, the "Perth."

Resembling in its general lines the "Iris" boats from which it is descended, the "Perth" shows important modifications in the extreme bows, which have been made much wider than the bows of earlier boats. This change has been made in order to provide accommodation for the automatic quick-firing gun which the

"Perth" is the first flying boat to mount. This gun fires $1\frac{1}{2}$ lb. shells at the rate of about 100 a minute, and thus the new type of flying boat is a really formidable opponent. In addition to the quick-firing gun, the "Perth" carries three machine guns of ordinary type, and a bomb load of 2,000 lb.

The wings of the "Perth" are of biplane form, and upper and lower wings have the same chord and span. Structurally the wings are of metal construction, with built-up box spars of duralumin, and wing ribs of duralumin tube. Walkways are provided on the lower centre-section wing to give access to the three Rolls-Royce "Buzzard II MS" engines, of which two are mounted on single pairs of interplane struts, while the central engine is carried on independent struts from the lower centre-section.

Three petrol tanks, each of a capacity of 575 gallons, are mounted under the upper wing, one above each engine, so that direct gravity feed to each engine is provided.

The hull of the "Perth" is built entirely of metal, "Alclad" being the material used for all members except highly-stressed fittings, which are of stainless steel. The boat construction incorporates full-section frames attached to a full-length keelson, with longitudinal stringers stiffening the "Alclad" planking.

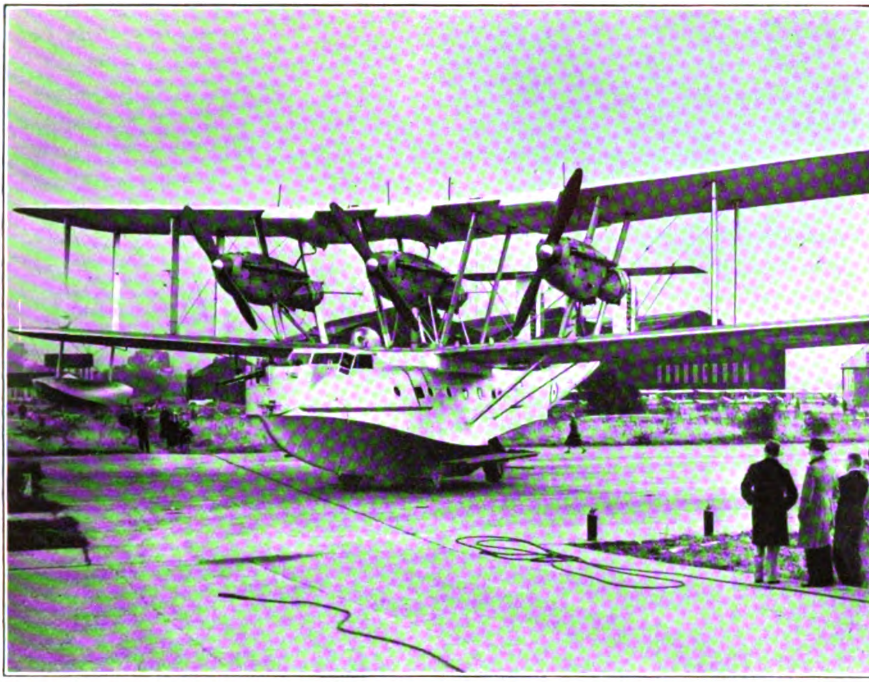
Accommodation is provided for a normal crew of five, consisting of first pilot, second pilot, navigator, wireless operator, and engineer. The last also acts as gunner. In addition to the quick-firing gun in the bows, there is a gun position in the extreme stern for the protection of the machine against attack from behind, and two machine guns are mounted just behind the wings.

With a wing span of 97 ft. and a total wing area of 2,511 sq. ft., the "Perth" has a tare weight of 20,927 lb. and a normal gross weight of 32,500 lb. The gross weight can, however, be increased to 38,000 lb., the extra load being used either for carrying a greater bomb weight, or extra fuel for giving an extended range. At sea-level the maximum speed is 132 m.p.h., and the normal range is 870 sea miles. The maximum range is 1,500 sea miles.

The Supermarine "Scapa."

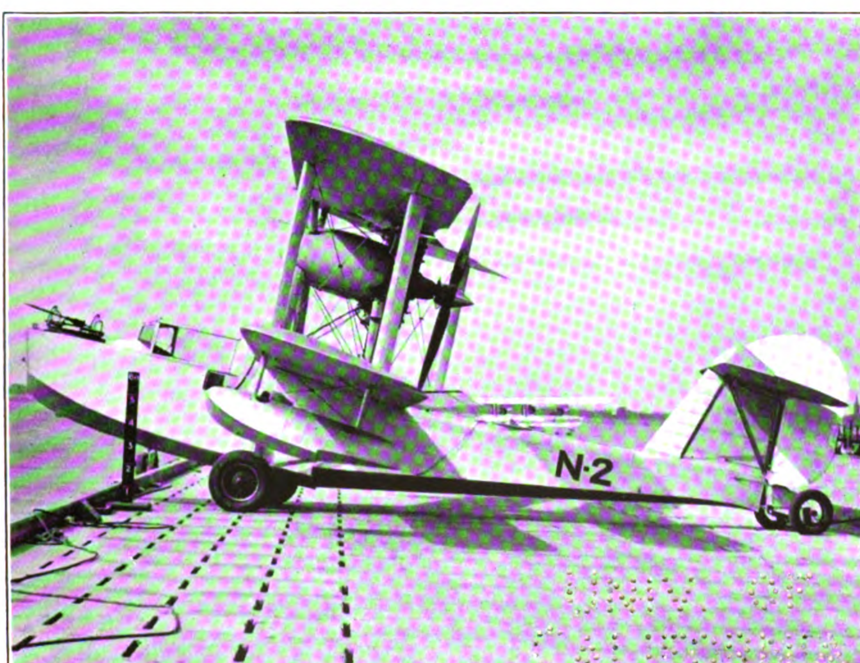
The "Scapa" is the latest of a long series of flying boats to be built by the Vickers-Supermarine Works, of Woolston, Southampton. The activities of this firm date back to before the War, when Mr. Noel Pemberton Billing founded the works at Woolston. Although the ownership has changed since those days, the name "Supermarine" has been retained, and has been associated with the production of flying boats ever since.

The "Scapa" differs in many respects from the Vickers-Supermarine "Southamptons," from which it has been developed. In outward appearance the greatest difference is to be found in the placing of the engines, two Rolls-Royce "Kestrels," which are slung close beneath the upper wing. In this position the airscrews are well clear of any flying spray, and the air intakes to the engines are in no danger of sucking in salt water during the take-off. Another



THE BLACKBURN "PERTH."

(By courtesy of "Flight.")



THE SUPERMARINE "SEAGULL," MK. V. AMPHIBIAN.

(Builders, The Supermarine Aviation Works, Southampton.)

(By courtesy of "Flight.")

improvement, from the crew's point of view, is that a roof has been added over the cockpit. Windows, windscreens, and skylights give a good view in all essential directions, and yet the occupants are protected against the weather. There is a gun station in the bows, and two more aft of the wings.

Before being finally adopted, the "Scapa" was put through very searching trials, including a non-stop flight of ten hours over the North Sea and a cruise to the Mediterranean. A total distance of 15,000 miles was flown during these trials, which included the following non-stop flights :—Plymouth–Lake Berre; Lake Berre–Malta; Malta–Gibraltar; Gibraltar–Malta; Malta–Aboukir; Aboukir–Lake Timsah; Lake Timsah–Port Sudan; Port Sudan–Lake Timsah; Lake Timsah–Gulf of Sollum; Gulf of Sollum–Malta; Malta–Gibraltar; Gibraltar–St. Nazaire; St. Nazaire–Felixstowe.

The full schedule of tests was carried out, and included taking-off, flying and climbing with but one engine running. Both engines were changed by the use of the portable changing gear carried on board. This was done while the machine was afloat. After being moored out for 144 hours, the hull showed no signs of corrosion.

The Short "Singapore III."

The third new type to be ordered by the Air Ministry is the Short "Singapore III." Few particulars of this machine are available, but it is a development of the "Singapore II," which it resembles in the general arrangement of its wings and hull, and in the placing of the engines in two tandem pairs, mounted on single pairs of interplane struts. The engines are Rolls-Royce "Kestrels."

It may be remembered that Messrs. Short Brothers, in their very large R.6/28 six-engined flying boat, used stainless steel for the bottom of the hull. The machine was flown with this bottom on trials, and structurally the material proved satisfactory in use. There was, however, some doubt about the joint between the stainless steel and the duralumin with which the sides were planked, and the Air Ministry official decided to have the stainless steel bottom planking removed. Corrosion was not pronounced, but for safety it was decided not to replace the steel bottom but to use instead one of "Alclad." This material is a "sandwich" with an inner layer of duralumin and outer layers of pure aluminium. It has been found to resist corrosion remarkably well, and is coming to be used more and more in British flying boat construction.

The "Singapore III" flying boats have, like the large six-engined machine, "Alclad" planking, and this material is also used for the upper portions of the hull.

The Saro "Clouds."

Although not a new type, mention should be made here of the "Cloud" designed and built by Messrs. Saunders-Roe, of Cowes. This little flying boat is one of a family of three produced by this firm, the other two being the very small "Cutty Sark," and the

slightly larger "Windhover." All three types have a general resemblance in that they have flat-sided vee-bottom metal hulls and cantilever wooden monoplane wings.

A considerable number of "Clouds" were ordered by the Air Ministry during the past year for training purposes, these machines being stationed at the Calshor Base in Southampton Water, where flying boat training, navigation, etc., are carried out. In the form used at Calshot the "Clouds" are amphibians. The fact that the undercarriage can be raised and lowered is not only of use in enabling the machines to visit either aerodromes or seaplane stations, but is also found very useful in the daily task of getting the machines up and down the slipways at Calshot, where much valuable time is saved by not having to drop and pick up again the beaching trolleys usually used in launching flying boats. The "Clouds" are equipped with two Armstrong-Siddeley "Serval" engines, mounted above the monoplane wing, where the airscrews are well protected against spray.

The Supermarine "Seagull V."

Of new types of flying boats produced during 1933, but not issued to the Royal Air Force, mention should be made of the Vickers-Supermarine "Seagull V," fitted with a Bristol "Pegasus" engine. This machine has been produced as a private venture, and is an amphibian with many interesting features, not the least of which is the installation of the "Pegasus" engine as a "pusher," i.e. driving an airscrew placed behind the engine. This arrangement has several advantages, the most important of which is that the airscrew is right away from the cockpit roof, so that for picking up moorings and handling on the water generally, the whole fore part of the hull can be walked on by the crew without fear of injury by the airscrew. Another advantage is that the noise which reaches the occupants is considerably reduced when the airscrew is situated behind the wings.

The "Seagull V" is an all-metal flying boat biplane, with wings of composite construction (stainless steel spars and wooden ribs) and aluminium alloy hull.

Great care has been taken in the design of the machine to obtain aerodynamic efficiency. For example, the land undercarriage is so designed that when the wheels are raised, they are housed in recesses in the lower wings, so that the amphibian gear does not spoil the "cleanness" of the machine. Lateral stability on the water is obtained in the normal British way by wing-tip floats, placed under the lower plane and in the plane of the single pair of interplane struts. The machine has been designed primarily for fleet spotting work to operate from an aircraft carrier, and as space is valuable the wings have been designed to fold back for stowage.

With a wing span of 46 ft. and a wing area of 610 sq. ft., the "Seagull V" has a tare weight (as an amphibian) of 4,450 lb., and a disposable load of 2,210 lb., giving a total weight of 6,660 lb. Without the land undercarriage the tare weight is reduced by 350 lb., which can then be used as extra load.

The Editor of "Flight."

NAVAL REFERENCE SECTION.

STATEMENT TO ACCOMPANY NAVY ESTIMATES, 1933.

The Navy Estimates for 1933, like those for 1932, have been restricted by the exigencies of the financial situation and do not fully provide for all the potential needs of the Navy.

The net total for 1933 is £53,570,000, and exceeds the net total for 1932 by £3,093,700.

But of this increase no less than £2,355,360 is required in order to make normal progress with New Construction. It will be recalled that a large part of the normal expenditure upon shipbuilding in 1932 was deliberately retarded and heaped into subsequent years by the temporary expedient of deferring the orders for the 1931 Programme. The remainder (£738,340) of the increase over 1932 does little more than make good an automatic rise in 1933 in the total of the Non-Effective Votes (£285,367 gross), an increase of £64,000 in the cost of maintenance of the Fleet Air Arm (no new flights are provided) and a further shrinkage in Receipts (£346,566) due to depressed trade conditions generally.

It follows that the sum provided in 1933 for effective naval services other than the New Construction Programme is not materially larger than in 1932.

The New Construction Programme for 1933 is as follows :—

- Four Cruisers (probably one " Leander " and three " Arethusas " *) ;
- One Leader and eight Destroyers ;
- Three Submarines ;
- Three Sloops ;
- One Convoy Sloop ;
- One Coastal Sloop ;
- Small Craft.

The Cruisers constitute the fourth and final instalment of the Replacement Programme due for completion by the 31st December, 1936, under the terms of the London Naval Treaty.

The numbers of Destroyers and Submarines are the same as in previous Building Programmes since the Treaty.

As in previous years, suitable allowance has been made for anticipated under-spending in contract work, etc.

B. EYRES MONSELL.

ADMIRALTY,
February 28, 1933.

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* Programme modified to three cruisers, two of 9,000 tons and one "Arethusa," and announced by First Lord, November 14, 1933 (see Chapter I).

NOTES ON MATTERS OF GENERAL INTEREST.

ROYAL VISITS TO THE FLEET.

His Majesty the King, in H.M. Yacht Victoria and Albert, reviewed the Home Fleet and witnessed exercises off Weymouth between July 12 and 14, 1932.

The Prince of Wales and Prince George visited the Mediterranean Fleet in the following month. They joined the Fleet at Corfu on August 13, 1932, and proceeded with it to Malta, witnessing manœuvres on the way.

DISTRIBUTION OF THE FLEET.

BATTLESHIPS AND BATTLE CRUISERS.

During the past year, in accordance with the London Naval Treaty, the Marlborough has been sold for scrapping, and the Iron Duke has been demilitarised for service as a Gunnery Training Ship. The Barham is still under reconstruction and will be completed early in 1934. The Ramillies is in hand for large repairs, and is expected to complete about July, 1934. The Repulse will be taken in hand for large repairs and alterations about April, 1933.

It was decided in March, 1932, that the number of battleships allotted to the Mediterranean Fleet should be reduced from six to five, and this reduction was effected by withdrawing the Ramillies. Similarly, it was decided that of the ten capital ships which would be in home waters, i.e., seven battleships (including the one withdrawn from the Mediterranean Fleet) and three battle cruisers, three should be treated as in Reserve.

AIRCRAFT CARRIERS.

The Courageous and the Furious have remained with the Home Fleet, and the Glorious has been the only aircraft carrier attached to the Mediterranean Fleet.

The large repair of the Eagle has been completed, and she will proceed to the China Station, relieving the Hermes for her large repair in 1933.

The Argus remains in reserve.

CRUISERS.

The Norfolk relieved the Delhi as Flagship of the America and West Indies Squadron in October, 1932, and the Delhi has taken over the duties of Flagship of the Third Cruiser Squadron in the Mediterranean Fleet, relieving the Colombo.

The Colombo has been placed temporarily in reserve, but later in the year will relieve the Emerald on the East Indies Station, the Emerald being due to return home for large repairs.

The Despatch completed large repairs at the end of January, 1933, and joined the Third Cruiser Squadron in place of the Curacoa, which is now being utilised for trooping duties, on completion of which she will relieve the Champion as Gunnery Firing Ship.

The Effingham, formerly Flagship of the East Indies Squadron, has reduced to reserve, being replaced by the Hawkins.

The Devonshire was temporarily lent to the China Squadron during the absence of the Berwick and the Cumberland, which returned home for refit, but she has now returned to the Mediterranean.

The four Cruisers of the 1929 and 1930 Programmes, viz., the Leander, Achilles, Orion, and Neptune, which will complete at various dates between March, 1933, and February, 1934, will be commissioned for service in the Second Cruiser Squadron.

Of the ships in the Second Cruiser Squadron relieved by these vessels, the Dorsetshire will replace the Cardiff as Flagship of the Africa Squadron, and the York and Exeter will relieve the Durban and Dauntless in the South American Division of the America and West Indies Squadron.

On return home, the Cardiff will reduce to reserve, the Durban will relieve the Ceres, and the Dauntless will relieve the Curlew; the Ceres and Curlew, on relief, will reduce to reserve.

Thus, by early 1934, the Third Cruiser Squadron will consist of "D" Class Cruisers, and the America and West Indies Squadron will consist of the Norfolk, Dragon, Danaë, York, and Exeter, the two last-named forming the South American Division.

LEADERS AND DESTROYERS.

The vessels of the 1929 programme, viz., the Leader Kempenfelt and the four Destroyers, Crusader, Comet, Cygnet, and Crescent, which were delivered early in the year, joined the Home Fleet.

Of the 1930 programme, the Leader Duncan, under construction at Portsmouth will shortly join the First Destroyer Flotilla in the Mediterranean Fleet. The eight destroyers, Defender, Diamond, Delight, Dainty, Diana, Duchess, Decoy, and Daring, are replacing older vessels in the Mediterranean.

Submarines.

The six submarines of the "Oberon" and "Rainbow" Classes in the First Submarine Flotilla, Mediterranean Fleet, and the six "L" Class Submarines in the Second Submarine Flotilla, Home Fleet, have maintained these flotillas at the same strength as in 1931.

The Rainbow has replaced the Poseidon in the Fourth Submarine Flotilla on the China Station, which has thus been brought up to its full strength of twelve submarines.

The Porpoise, Seashore, and Starfish, of the 1930 programme, will be completed during 1933. The Porpoise will join the Fifth Submarine Flotilla at Portsmouth, and the Seahorse and Starfish will relieve submarines of the "H" Class in the Sixth Submarine Flotilla at Portland.

Sloops.

The new sloops, Milford, Weston, and Dundee, of the 1930 programme, have replaced, or will shortly replace, old sloops abroad.

The Falmouth has replaced the Petersfield as tender to the Flagship on the China Station.

The Guardian, a sloop fitted for netlaying and for target-towing, which will be completed at Chatham about the end of June, 1933, will in due course replace the Snapdragon.

River Gunboats.

The gunboat Moorhen will pay off at Hong Kong in April, 1933, being now unfit for further service.

The new gunboat, Sandpiper, of the 1931 programme, will be completed at Shanghai in June, 1933, for service in the Yangtse. This vessel has been designed specially for service in the lakes during the low-water season.

The Peterel grounded in the upper section of the Yangtse River in May, 1932, but was refloated and repaired at Shanghai.

Fleet Target Ship.

The Fleet Target Ship, H.M.S. Centurion, which was laid up in 1932 for reasons of economy, will recommission for further service with the Home and Mediterranean Fleets towards the end of 1933.

CO-OPERATION WITH THE DOMINIONS, ETC.

The Commonwealth of Australia.

It is hoped that it will be possible before long to resume the interchange of ships between the Royal Navy and the Royal Australian Navy, which has been suspended for financial reasons.

Kenya Colony.

The Kenya Royal Naval Volunteer Reserve was established on January 1, 1933. This force will in due course provide the essential services required for the local naval defence of the Colony.

FLEET ACTIVITIES ABROAD.

Home Fleet.

The title of Atlantic Fleet was altered to that of Home Fleet in March, 1932.

The Second Cruiser Squadron, consisting of the Dorsetshire, Exeter, and York, under the command of Vice-Admiral E. A. Astley-Rushton, C.B., C.M.G., visited Copenhagen in September, 1932, during the British Trade Exhibition, and the visit is believed to have added greatly to the success of the Exhibition.

Mediterranean Fleet.

On the occasion of the earthquake near Salonika on September 26, 1932, the Resolution, the Resource, the Keith, the Basilisk, and the Bulldog were sent to render assistance, and remained for some time in the area, providing food and medical and

other assistance, and helping the stricken population to commence rebuilding their homes.

Red Sea and Persian Gulf.

Co-operation with the Royal Air Force has been well maintained.

The usual anti-slavery patrols by two sloops have been carried out in the Red Sea without incident. By the presence of these vessels the slave traffic is reduced to almost negligible dimensions. Their withdrawal would undoubtedly result in a large increase in the traffic.

The Emperor of Abyssinia was conveyed from Berbera to Aden and back in the Penzance in January.

America and West Indies.

In November, 1932, the Dragon was despatched from Bermuda to Cayman Brac when that island had been devastated by a hurricane. She was able to render medical assistance and to supply stores and water to the inhabitants of Cayman Brac and Little Cayman.

In September, 1932, the Challenger, while surveying off the coast of Labrador, struck an uncharted rock off Forde Harbour. The Heliotrope was sent to her assistance, but she was able to proceed under her own steam to Halifax, where she was docked.

South America.

After the first Chilean revolution, which occurred in June, 1932, the Durban was despatched to Callao. The ship remained in the vicinity of Peru until the end of September.

Early in September, trouble was threatened in Santos owing to the civil war in Sao Paulo. The Scarborough, which was about to proceed on a cruise up the Amazon, was ordered to Santos, where she remained until the arrival of Federal Forces.

China.

The bandit activities and local civil wars, which necessitate the presence of our gunboats and other vessels for the protection of British interests, have continued.

The presence of H.M. ships at Shanghai during the critical state of affairs resulting from strained relations between China and Japan was of great value in the protection of British life and property, and helped to moderate and stabilise the situation.

Reinforcements were brought in H.M. ships from Hong Kong, and landing parties assisted the Defence Force in preventing the fighting from spreading into the Settlement.

The British Naval Commander-in-Chief was largely instrumental in bringing about local peace negotiations, and in assisting their successful conclusion.

In North China, H.M. ships have been stationed at important points during the Manchurian dispute for the protection of our interests in the vicinity.

On the occasion of conflict between Chinese and Japanese forces, two sloops were sent to Chinwangtao, and their presence helped to localise the affair and safeguarded important British interests.

The presence of one of our sloops at Newchwang contributed to the negotiations for the release of two British subjects who had been captured by bandits.

In consequence of local civil wars near Chefoo and Amoy, several ships were stationed there to afford protection to British life and property, and the moral effect of their presence assisted those responsible for maintaining law and order.

A Destroyer Patrol has been maintained on the shipping routes in the vicinity of Bias Bay as a deterrent to acts of piracy, and the number of such acts has been reduced.

HYDROGRAPHY.

H.M. Surveying Ships have been fully employed in making new surveys and re-surveys as necessary, four being employed at home and four abroad. Of the latter, one has been employed in the Far East, one in the Persian Gulf and Mediterranean, one on the West Coast of Africa and the Mediterranean, and one (the Challenger) on the coast of Labrador.

Echo sounding continues to be developed, with very promising results.

The compilation, engraving, and printing of new charts, the issue of new editions of old charts, and the publication of Notices to Mariners, Sailing Directions, Tide Tables, Light Lists, the Admiralty List of Wireless Time Signals, and Wireless Navigational Warnings, continue as usual.

METEOROLOGY.

Progress has continued, in collaboration with the Air Ministry, in the development of Fleet Meteorology, the improvement of meteorological instruments for the use of the Fleet Air Arm and H.M. ships generally, and the collection of meteorological data.

NAVIGATION.

H.M. ships have co-operated in the improvement of navigational aids and equipment, including instruments for accurately determining the speed of ships.

The series of observations to ascertain the dip of the sea horizon has been concluded, and the results promulgated.

The new steering orders, which are now in the direct sense, were introduced into the Royal Navy on January 1, 1933.

A new type of automatic course recorder is on trial.

FISHERY PROTECTION.

The work of the Fishery Protection and Minesweeping Flotilla in protecting and assisting the fishing fleets, and in training reserve officers and men in minesweeping, has continued.

A Fishery Protection gunboat has visited Iceland and the Faroe Islands periodically in the interests of British Trawlers in these waters. In February, 1933, the Captain commanding the Fishery Protection and Minesweeping Flotilla personally investigated the Cod-Net Fishing in the Moray Firth, with a view to improvement of the protection service in this area.

CO-OPERATION BETWEEN THE SERVICES.

Combined exercises with the Army and the Royal Air Force have been included in the programmes of squadrons whenever opportunity has offered, and the customary Combined Exercises between the Staff Colleges of the three Services have also taken place.

Valuable experience continues to be obtained.

Interchange of officers between the three Defence Services has continued throughout the year with benefit to all concerned.

NAVAL AIR WORK.

The appointment of a Rear-Admiral, Aircraft Carriers, has resulted in marked progress in the investigation of a number of important problems in Naval Air Work.

The arrangement whereby the three largest Aircraft Carriers meet and work together in the Mediterranean during the Spring Cruise is being continued.

Steady progress is being made in the installation and operation of catapults; fifteen are now fitted in capital ships and cruisers.

Obsolete single-seated fighter aircraft are being steadily replaced by modern single-seater fighter and two-seater fighter reconnaissance types. Pending the production of up-to-date aircraft to replace the existing spotter-reconnaissance and torpedo-bomber machines, certain improvements are being made in the machines actually in service.

One hundred and forty-one Naval and Royal Marine Officers are now trained as Pilots for the Fleet Air Arm, and thirteen are under training.

Eighty Naval Officers are trained as Observers, and seven are under training.

It is regretted that five Naval Pilots and one Observer were killed in aircraft accidents in 1932; one pilot and one observer were lost in H.M. Submarine M.2.

NAVAL COMMUNICATION.

The efficiency of Naval Wireless Communication was well demonstrated during the crisis in China in the early part of 1932, when, in addition to the great increase in Naval wireless messages, a very large number of messages were dealt with for the War Office and Foreign Office.

The arrangements for broadcasting official messages to ships of the British Mercantile Marine, by the co-operation of all concerned, continue to show a most satisfactory improvement.

The 1931 edition of the International Code of Signals has been introduced into the Royal Navy for exercise purposes, pending its international adoption on January 1, 1934.

PERSONNEL.

Progress in the tactical training of the Fleet has been satisfactory.

For reasons of economy, the Combined Exercises between the Home and Mediterranean Fleets this year consist of certain destroyer exercises only.

Instructions have been issued to the Fleet to ensure that full attention is paid to the individual training of the personnel and units of the Fleet. Adequate opportunity is being given to Commanding Officers for the training of their officers and men, and a policy of decentralisation is being encouraged with a view to giving more opportunity for the exercise of initiative and power of command.

As indicated in the statement accompanying the 1932 Estimates, the new scheme for the promotion of ratings to commissioned rank is in a transitional stage. It will, however, be in full operation for the selections to be made in 1933.

In view of the great importance of the examination of Leading Seamen in professional subjects for the rating of Petty Officer, it has been decided that in future this examination shall be carried out by Boards composed of Officers appointed by the Flag Officer commanding the Squadron, instead of Boards consisting solely of Officers of the candidates' own ships, the arrangement previously in operation. The examination is oral and practical.

A new Naval Wireless Auxiliary Reserve has been instituted in order to provide a reserve of trained operators for the Navy, its members being recruited from civilian enthusiasts in wireless.

A committee has recently considered the conditions of service of signal and telegraphist ratings, and its report will receive the attention of the Board of Admiralty.

The first step in transferring responsibility for certain electrical equipment to the Engine Room department has now been completed, and the necessary arrangements for training the Engine Room personnel have worked smoothly and efficiently.

The new establishment for training Artificer Apprentices at Chatham has proved entirely satisfactory and, apart from the greater efficiency in training, the concentration has led to considerable financial saving.

The training of Special Entry Cadets and Paymaster Cadets will in future be given in H.M.S. Frobisher, a sea-going cruiser specially fitted out for the purpose, and Cadets from the Royal Naval College, Dartmouth, will also be trained at sea in this cruiser on leaving the College.

In order that Special Entry Cadets may become Commissioned Officers at the same age as Cadets from the R.N. College, Dartmouth, the age limits for their entry have been reduced from 17½–18½ to 17–18 years.

Messing Allowances have been revised, and re-arranged on a sliding scale to meet the variations in the cost of living on the several stations.

Revised Uniform Regulations for men have been promulgated, and additional facilities provided for them to obtain articles of uniform and clothing of the pattern and description prescribed therein.

MATERIEL. NEW CONSTRUCTION.

CRUISERS.

1929 *Programme.*

The Leander, the first of a new class of 6-inch gun ships, has successfully completed her sea and gun trials, and will shortly commission.

1930 *Programme.*

The Achilles, building by Cammell Laird and Company, Limited, Birkenhead, was launched on September 1, 1932. The Orion, building at Devonport, and the Neptune, building at Portsmouth, were launched on November 24, 1932, and January 31, 1933, respectively.

1931 *Programme.*

The orders for the Ajax and the Amphion have been placed with Vickers-Armstrongs, Limited, Barrow-in-Furness, and H.M. Dockyard, Portsmouth, respectively. The Arethusa, the first vessel of her type, and of smaller dimensions than the Leander, is under construction at Chatham, having been laid down on January 25, 1933. All three ships should be completed by July, 1935.

1932 *Programme.*

The Apollo will be built at Devonport, and the Phæton has been ordered from Swan, Hunter and Wigham Richardson, Wallsend-on-Tyne.

The Galatea, the second ship of the "Arethusa" type, has been ordered from Scott's Shipbuilding and Engineering Company, Limited, Greenock.

FLOTILLA LEADERS AND DESTROYERS.

1929 *Programme.*

The Leader Kempenfelt and the four destroyers, Crusader, Comet, Cygnet, and Crescent, were completed during the current financial year.

1930 *Programme.*

The Leader Duncan has satisfactorily finished her machinery trials, and her completion at Portsmouth will take place at the end of the current financial year.

The eight destroyers of the "Defender" Class, viz., the Defender, Diamond, Dainty, Delight, Diana, Duchess, Daring, and Decoy, have been completed.

1931 *Programme.*

The order for the construction of the Leader Exmouth was placed with H.M. Dockyard, Portsmouth, in November, 1932, and she is due to complete in the financial year 1934.

Orders for building the destroyers of this programme were placed in November, 1932. The Eclipse and the Echo are being built by Denny, Limited, Dumbarton; the Electra and the Encounter by Hawthorn Leslie, Hebburn-on-Tyne; the Escapade and the Escort by Scott's Shipbuilding and Engineering Company, Limited, Greenock; and the Esk and the Express by Swan, Hunter and Wigham Richardson, Wallsend. These vessels will complete in the financial year 1934.

1932 *Programme.*

The order for the construction of the Leader Faulkner has been placed with Yarrow and Company, Scotstoun, and those for the destroyers have been placed with the following firms:—

Fearless and Foresight .	Cammell Laird and Company, Birkenhead.
Fame and Firedrake .	Parsons Marine Steam Turbine Company, Wallsend-on-Tyne. (Hulls by Vickers-Armstrongs.)
Foxhound and Fortune .	John Brown and Company, Clydebank.
Forester and Fury .	J. S. White and Company, East Cowes.

SUBMARINES.

1929 *Programme.*

The Thames, the first of the new "River" Class of submarine, after successful trials, was completed by Vickers-Armstrongs, Limited, Barrow-in-Furness, and was commissioned for service in September, 1932. This vessel has been fitted with Admiralty designed engines, which are arranged for super-charging. The horse-power developed was considerably greater than that of any other submarine on service, and the performance of the vessel was highly satisfactory in all respects.

The Swordfish, the first of a smaller type of submarine, was completed at Chatham, and passed into service in November, 1932. Her engine design is of interest in that the engine and columns are of a fabricated type embodying the use of welding. The Sturgeon, the second vessel of the class, is due to complete at Chatham towards the end of the current financial year.

1930 *Programme.*

The Porpoise, a minelaying submarine, which was launched at Vickers-Armstrongs' works, Barrow-in-Furness, on August 30, 1932, will complete at the end of the current financial year.

The Seahorse was launched at Chatham on November 15, 1932, and the Starfish will be launched during March, 1933. Both vessels are of the Swordfish type, and are due for completion in the autumn of 1933.

1931 *Programme.*

The Severn, of the "River" Class, with slight improvements, was ordered from Vickers-Armstrongs, Limited, in December, 1932.

The Shark and the Sealion, of the improved "Swordfish" Class, have been ordered from H.M. Dockyard, Chatham, and Cammell Laird and Company, Limited, Birkenhead, respectively.

1932 *Programme.*

Orders have been placed for the Clyde, of the "River" Class, with Vickers-Armstrongs, Barrow-in-Furness, and for the Salmon, of the improved "Swordfish" Class, with Cammell Laird and Company, Limited, Birkenhead. Both will be commenced in March, 1933. The Grampus, of the "Porpoise" Class, will be built at Chatham, being commenced in June, 1933.

The trial performances of all the new vessels show a continued improvement in fuel economy, while the reduction in the weight of the machinery and in the space required for it has continued.

Sloops.

Two sloops of the 1930 Programme, viz., the Falmouth and Milford, have been completed. The two remaining sloops, viz., the Weston, at Devonport, and the Dundee, at Chatham, will be completed during the present financial year.

Preliminary work has been commenced at Devonport on the two sloops of the 1931 Programme, viz., the Grimsby and the Leith, which were laid down on January 23 and February 6, respectively.

The contract for building the two sloop-minesweepers of the 1931 Programme, viz., the Halcyon and the Skipjack, has been placed with J. Brown and Company, Limited, Clydebank. They are about to be laid down, and will probably be completed early in the financial year 1934.

The two sloops of the 1932 Programme, the Lowestoft and the Wellington, which are to be built at Devonport, will be ordered early in the forthcoming financial year.

The contract for building the two sloop-minesweepers of the 1932 Programme, viz., the Harrier and the Hussar, has been placed with J. I. Thornycroft and Company, Limited, Southampton.

China River Gunboats.

The Sandpiper (1931 Programme) was ordered from J. I. Thornycroft and Company, Limited, Southampton, and was erected at Woolston. The dismantled parts will be transhipped to Shanghai, where the ship will be completed in 1933.

The Robin (1932 Programme) has been ordered from Yarrow and Company, Limited, Scotstoun.

Depot Ship for Destroyer Flotilla.

The order for the construction of the Woolwich will have been placed by the end of the current financial year.

Netlayer and Target-Towing Vessel.

The Guardian (1930 Programme) was floated out of dock on September 1, 1932, and will complete in the summer of this year.

Miscellaneous.

Two Harbour-Service Fuelling Tugs for Malta, a Mining Lighter, and a Cable Lighter, have been completed at Portsmouth.

The Skylark, Tender for the Mining School (1931 Programme), which was laid down in June, 1932, has recently been completed.

The Bishopgate, Boom Defence Vessel (1931 Programme), which was built by Robb, Limited, Leith, was delivered in December, 1932.

Orders for Tenders for the Submarine Depot, Portland, and for the Torpedo School, Devonport (1932 Programme), will have been placed by the end of the current financial year, and the order for the Aldgate, Boom Defence Vessel (1932 Programme), will be placed shortly.

ADMIRALTY ADMINISTRATION AND MISCELLANEOUS.

During 1932, the Department of the Accountant-General of the Navy was merged with the Department of the Secretary of the Admiralty, the effect of this change being to simplify and improve Admiralty organisation and to reduce the cost of the Office.

Sir Frank Dyson, K.B.E., Sc.D., LL.D., F.R.S., retired in February, 1933, from the post of Astronomer Royal, which he had held with great distinction since 1910. He has been succeeded by Dr. H. Spencer Jones, M.A., Sc.D., F.R.S., who was previously Astronomer at H.M. Observatory at the Cape of Good Hope.

The process of putting into force the changes recommended by Mr. R. S. Hilton's Committee in the financial system of the Dockyards continues. The changes at Portsmouth, Devonport, and Malta Dockyards are completed, and those at Chatham

and Sheerness Dockyards are approaching completion. At Chatham, the system of mustering workmen at their place of work by means of time-recorder clocks is in the course of installation. Preliminary steps are being taken to effect similar changes, except clock-mustering, at Gibraltar and Portland Dockyards.

The substitution of Royal Marine Police for Metropolitan Police at Chatham Dockyard was completed on February 1, 1932. The new arrangements have so far proved entirely satisfactory, and it has been decided to carry out a similar change at Portsmouth Dockyard during the coming financial year.

The salvage operations on submarine M.2 were abandoned on December 9, 1932.

These operations, though unsuccessful, have given the Admiralty much valuable experience.

All submarines have now been equipped with Davis Submerged Escape Apparatus, which provides the crew of a disabled submarine with their own means of escape, entirely independent of special lifting or salvage appliances. Special escape hatches and indicator buoys have been, or will be, fitted to all submarines to facilitate the escape and rescue of the escaping crew. This method of escape, which entails the flooding of the disabled submarine, has been accepted by the Admiralty, in preference to the many ingenious devices for raising sunken submarines which have been considered.

Owing to the salvage operations on H.M. Submarine M.2, it was not possible to carry out the confirmatory deep diving trials foreshadowed in the statement accompanying the 1932 Estimates. It is, however, hoped that these will be carried out in 1933.

The new model Experimental Tank at Haslar for testing ship models has now been completed and brought into use.

An active part continues to be taken by Admiralty representatives in the work of various Committees of the British Standards Institution and other bodies in the preparation of specifications for engineering material.

The progress of research and experiment both ashore and afloat is kept under continuous review, and liaison has been maintained with the Air Ministry, the Department of Scientific and Industrial Research, and various Engineering Committees and Institutions.

Trials of a boiler of a new express type have been satisfactorily carried out and will be continued under service conditions in H.M.S. Guardian.

Arrangements have also been made to carry out trials of another type of water-tube boiler in course of manufacture, which offers the possibility of a greater output for a given weight. It will be fitted in one of H.M. ships for trial under service conditions, subject to satisfactory shop trials.

Experimental work on standard type boilers of increased size has been carried out, and the information obtained has led to the development of larger boiler units in new designs with an attendant saving in machinery weight.

Trials of various fuels, including burning tests of coal-oil mixtures and of fuel oil produced from coal, have been continued at the Oil Fuel Experimental Station, Haslar.

After preliminary trials in H.M.S. Westminster, a contract has recently been placed for a quantity of oil fuel produced from British coal by low-temperature carbonisation, and this is being tried in a number of H.M. Ships.

Steady progress has been made at the Admiralty Engineering Laboratory in the development of high-speed ignition compression oil engines for Naval purposes.

The development of high-speed heavy oil engines, of relatively low power, suitable for generators and boat work, is being closely watched, and a number of tests have been carried out with commercial engines, which show promise of suitability for naval requirements, in order to widen the field from which such engines can be obtained. The use of such designs afloat is being extended rapidly for electric generators in new cruisers and destroyers, and also for use as propelling units in ships' power boats.

Progress has been maintained in increasing the facilities for self-maintenance in existing vessels, and the amenities in the smaller vessels of the Fleet have been improved by the provision of small automatic refrigerating plants.

Economy has been effected by adopting a simplified system of fire control in some of the new ships and also by reducing complication in gun mountings.

ABSTRACT OF NAVY ESTIMATES FOR 1933.

Votes.		Estimates 1933. Gross Estimate.	Estimates 1933. Net Estimate.	Estimates 1932. Net Estimate.
	I.—Numbers.		Maximum Numbers.	Maximum Numbers.
A.	Number of Officers, Seamen, Boys, and Royal Marines	90,300	90,300	91,410
	Number of Royal Marine Police	865	865	865
	II.—Effective Services.	£	£	£
1	Wages, etc., of Officers and Men of the Royal Navy, and Royal Marines, and Civilians employed on Fleet Services	12,649,419	12,593,000	12,627,000
2	Victualling and Clothing for the Navy	3,711,791	3,099,800	3,074,300
3	Medical Establishments and Services	440,017	369,800	380,700
4	Fleet Air Arm	1,089,000	1,089,000	1,025,000
5	Educational Services	258,560	198,500	218,400
6	Scientific Services	535,727	474,500	473,800
7	Royal Naval Reserves	355,370	355,000	350,000
8	Shipbuilding, Repairs, Maintenance, etc.:			
	Section I.—*Personnel*	6,227,386	6,176,400	6,324,700
	Section II.—*Matériel*	5,065,400	4,579,200	4,464,750
	Section III.—Contract Work	7,667,595	7,635,700	5,193,200
9	Naval Armaments	4,213,783	4,024,100	3,488,200
10	Works, Buildings, and Repairs at Home and Abroad	2,402,800	2,184,300	2,245,700
11	Miscellaneous Effective Services	696,960	560,000	641,250
12	Admiralty Office	1,101,569	1,090,200	1,104,300
	Total Effective Services £	46,415,377	44,429,500	41,611,300
	III.—Non-Effective Services.			
13	Naval and Marine, Officers	3,194,522	3,178,200	3,093,500
14	Naval and Marine, Men	4,914,350	4,889,100	4,727,800
15	Civil Superannuation, Compensation Allowances, and Gratuities	1,076,197	1,073,200	1,043,700
	Total Non-Effective Services £	9,185,069	9,140,500	8,865,000
	Grand Total £	55,600,446	53,570,000	50,476,300

Net Increase . . . . . £3,093,700.

Admiralty, 22 *Feb.*, 1933

B. Eyres Monsell,
Ernle Chatfield,
Dudley Pound,
C. M. Forbes,
Geoffrey Blake,
C. J. C. Little,
Stanley,
Euan Wallace,
O. Murray.

STATEMENT SHOWING THE NUMBERS BORNE, THE EXPENDITURE ON NAVAL SERVICES FOR THE YEARS 1917 TO 1931, AND THE ESTIMATES FOR 1932 AND 1933.

YEAR	VOTE A. — Average numbers borne. (a)	VOTE 1. — Wages, &c., of Officers, &c	VOTE 2. — Victualling and Clothing.	VOTE 3. — Medical Establishments, &c.	VOTE 4. — Civilians employed on Fleet Services.	VOTE 5. — Educational Services.	VOTE 6. — Scientific Services.	VOTE 7. — Royal Naval Reserves.	VOTE 8. — Shipbuilding, Repairs, Maintenance, &c. Section I. Personnel.	VOTE 8. Section II. Matériel.	VOTE 8. Section III. Contract Work.	VOTE 9. — Naval Armaments.	VOTE 10. — Works.	VOTE 11. — Miscellaneous.	VOTE 12. — Admiralty Office.	VOTE 13. — Half Pay, &c.	VOTE 14. — Naval, &c., Pensions.	VOTE 15. — Civil Superannuation, &c.	Balances Irrecoverable	Total Expenditure.
		£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
1917	406,977	37,559,536	13,481,159	792,569	561,308	210,243	152,160	874,930	12,660,160	36,494,694	70,609,055	34,177,359	6,556,790	9,193,802	1,454,835	709,227	1,446,247	413,746	41,092	227,388,891
1918	381,311	46,373,511	24,219,351	1,158,287	491,270	247,922	262,886	871,970	15,037,763	59,128,675	94,248,874	64,866,784	10,928,241	9,357,532	1,985,894	704,914	3,733,778	445,485	28,090	334,091,227
1919	176,087	32,385,306	8,823,106	733,046	556,778	401,864	364,832	458,044	12,426,177	Credit :— 785,986	48,348,933	14,441,835	5,595,608	11,118,631	2,042,715	1,176,937	15,133,064	802,279	60,875	154,084,044
1920	124,009	21,314,360	8,311,708	683,830	759,110	503,152	249,185	359,694	12,096,747	6,799,965	12,001,445	8,493,951	4,992,969	5,724,974	2,073,764	2,352,344	4,847,475	880,996	23,611	92,505,200
1921	127,180	19,220,859	6,831,481	643,735	480,243	405,592	359,575	423,056	10,690,188	8,835,771	4,834,336	6,253,468	4,746,485	3,506,514	1,780,641	2,002,201	3,881,368	1,020,693	69,935	75,986,141
																Non-effective Services. Officers.	Non-effective Services. Men.			
1922	107,782	15,762,232	4,767,118	492,410	258,600	382,065	354,961	423,722	7,075,533	3,877,716	3,225,598	3,678,783	3,553,831	2,096,219	1,371,961	3,701,984	5,471,088	968,880	29,679	57,492,380
1923	99,107	14,175,111	4,153,803	410,842	193,793	330,644	379,489	459,391	6,751,496	5,521,336	4,427,874	3,840,606	3,215,766	982,173	1,247,813	2,856,764	4,260,245	823,340	33,864	54,064,350
1924	99,453	14,150,963	4,152,902	442,756	190,669	334,648	393,054	446,902	7,489,659	5,592,183	5,415,210	3,507,190	3,140,887	1,065,869	1,349,519	2,868,798	4,328,526	811,797	12,355	55,693,787
					Fleet Air Arm (b)															
1925	100,284	14,576,499	4,226,570	440,209	1,320,000	327,226	417,552	465,114	7,929,259	6,905,184	6,305,406	4,247,113	2,422,050	826,119	1,307,790	2,812,336	4,449,585	928,326	8,110	60,004,548
1926	100,791	14,322,678	4,236,846	434,919	681,000	324,036	393,339	444,759	7,487,952	5,422,141	7,275,173	3,595,037	2,108,441	930,369	1,203,639	2,914,419	4,450,140	894,472	23,002	57,142,862
1927	101,916	14,568,462	4,182,491	423,777	882,000	224,334	402,976	419,086	7,067,419	4,678,052	8,839,423	3,996,749	1,900,788	844,852	1,233,132	2,966,485	4,525,353	965,602	2,276	58,123,257
1928	100,680	14,435,347	3,992,639	418,863	1,008,300	226,486	396,298	403,295	6,743,571	5,074,290	8,263,060	3,871,235	1,950,207	728,841	1,181,125	3,006,321	4,496,310	944,735	4,223	57,139,146
1929	99,300	14,286,313	3,840,098	419,371	1,066,000	226,449	467,343	387,241	6,561,827	4,977,230	7,201,217	3,868,369	2,079,775	725,511	1,194,842	3,075,856	4,550,155	968,944	1,239	55,987,770
1930	94,921	13,996,225	3,531,280	394,505	1,267,000	224,722	470,965	395,648	6,227,647	4,198,553	5,532,728	3,557,624	1,928,639	667,107	1,178,675	3,121,672	4,592,970	983,198	5,033	52,274,186
1931	92,449	13,432,777	3,145,731	379,239	1,126,000	219,367	451,498	394,007	6,331,341	4,517,054	4,717,751	3,326,274	2,399,570	683,774	1,114,266	3,123,812	4,625,833	1,026,306	652	51,014,752
1932 (estimate)	91,410(c)	12,627,000	3,074,300	380,700	1,025,000	218,400	473,800	350,000	6,324,700	4,464,750	5,193,200	3,488,200	2,245,700	641,250	1,104,300	3,093,500	4,727,800	1,013,700	—	50,476,300
1933 (estimate)	90,800(c)	12,598,000	3,099,800	360,500	1,089,000	198,500	474,500	355,000	6,176,400	4,579,200	7,635,700	4,024,100	2,184,300	560,000	1,090,200	3,178,200	4,859,100	1,078,200	—	53,570,000

Note.—The figures for Expenditure represent the Net Expenditure after taking into account receipts noted in the Navy Appropriation Account as receipts in excess of estimated Appropriations in Aid.

(a) Exclusive of Royal Marine Police.

(b) Replacing "Civilians employed on Fleet Services," transferred to Vote 1 in 1925.

(c) Maximum for the year.

EXPENDITURE FOR NAVAL PURPOSES OF THE PRINCIPAL FOREIGN POWERS.

UNITED STATES NAVY.

Appropriation Bill, 1932 (July 1, 1932, to June 30, 1933).

Appropriation Title.	Appropriations. 1932–33. Dollars.	Appropriations. 1931–32. Dollars.
Salaries, office of the Secretary of the Navy	215,520	215,520
Salaries, General Board	12,560	12,880
Salaries, Naval Examining Board	10,600	10,600
Salaries, Compensation Board	8,700	8,700
Contingent expenses, Navy Department	80,000	85,000
Printing and binding	550,000	575,000
Pay, Miscellaneous	1,450,000	1,555,500
Contingent, Navy	15,000	30,000
State Marine Schools	217,600	100,000
Care of lepers, Guam	35,000	38,000
Operation and conservation of Naval Fuel Reserves	—	160,000
Naval Research Laboratory	213,000	229,765
Salaries, office Naval Records and Library	39,240	39,960
Salaries, office of Judge Advocate General	130,240	130,240
Salaries, office of Chief of Naval Operations	73,760	73,760
Salaries, Board of Inspection and Survey	20,780	21,280
Salaries, Naval Communications	134,980	136,120
Salaries, Office of Naval Intelligence	41,440	41,620
Recreation for enlisted men	368,000	400,000
Contingent, navigation	9,000	10,000
Gunnery and engineering exercises	42,750	50,000
Instruments and supplies	533,243	776,091
Ocean and lake surveys	65,000	86,600
Naval training station, California	160,200	190,000
Naval training station, Rhode Island	202,000	271,000
Naval training station, Great Lakes	245,000	275,000
Naval training station, Hampton Roads	225,000	235,000
Naval Reserve	3,077,686	4,620,835
Naval Reserve Officers' Training Corps	90,085	130,000
Naval War College	110,000	116,958
Salaries, Bureau of Navigation	500,540	500,540
Salaries, Hydrographic Office	430,980	431,980
Contingent and miscellaneous expenses, Hydrographic Office	138,120	144,500
Salaries, Naval Observatory	193,540	196,300
Contingent and miscellaneous expenses, Naval Observatory	25,000	42,500
Astrographic and astronomical plant	114,000	50,000
Engineering Engineering Experimental Station, Annapolis	18,030,000	19,243,040
Salaries, Bureau of Engineering	333,040	333,040
Construction and repair of vessels	15,821,000	18,451,400
Salaries, Bureau of Construction and Repair	393,900	393,900
Ordnance and ordnance stores Torpedoes and appliances	11,271,000	11,930,585
Purchase and manufacture of smokeless powder	1,000,000	1,000,000

UNITED STATES NAVY—*continued.*

Appropriation Title.	Appropriations. 1932–33. Dollars.	1931–32. Dollars.
Salaries, Bureau of Ordnance	165,000	166,020
Pay, Subsistence and transportation	149,877,831	154,040,870
Maintenance, supplies and accounts	9,417,500	10,100,000
Fuel and transportation	6,735,000	8,513,171
Salaries, Bureau of Supplies and Accounts	873,000	876,220
Medical Department	1,840,000	2,080,000
Care of the dead	68,000	75,000
Salaries, Bureau of Medicine and Surgery	87,560	87,560
Maintenance, Yards and Docks	8,400,000	9,014,816
Contingent, Yards and Docks	138,000	150,000
Salaries, Bureau of Yards and Docks	314,020	317,300
Public works	2,490,000	12,164,000
Aviation, Navy	25,245,420	31,145,000
Salaries, Bureau of Aeronautics	290,400	290,400
Pay, Naval Academy	861,517	919,154
Current and miscellaneous expenses, Naval Academy	79,700	90,000
Maintenance and repairs, Naval Academy	940,000	1,000,000
Pay, Marine Corps	15,151,089	16,471,185
Pay, civil employees, Marine Corps	305,030	305,567
General expenses, Marine Corps	6,458,720	8,598,435
Increase of the Navy—C. and M.	15,063,000	31,100,000
Increase of the Navy, A. A. and A.	3,000,000	7,200,000
Modernisation of vessels	14,000,000	—
Contract authorisation for aeroplanes	—	7,700,000
Total Annual appropriations.	317,583,591	358,253,952
Total Permanent and indefinite	1,322,550	1,838,510
Total	318,906,141	360.092,462

A sum of 238 million dollars of the total of 3,300 million dollars authorised by the National Industrial Recovery Act (1933) for the expenditure on public works has been allocated for naval construction. This sum provides for the construction of 32 vessels for which contracts have now been placed; 46 million dollars is to be expended during the fiscal year 1933-34, 105 million dollars during the fiscal year 1934-35, and the remainder during the fiscal year 1935-36.

IMPERIAL JAPANESE NAVY.

ESTIMATES, 1933-34 (April 1, 1933, to May 31, 1934).

The Estimates of the Imperial Japanese Navy are divided under two headings "Ordinary" and "Extraordinary."

The figures for 1932-33 as compared with the previous year are as follows:—

	1933-34. Yen.	1932-33. Yen.	1931-32. Yen.
Ordinary	178,822,411	—	141,209,983
Extraordinary	224,948,927	—	69,665,155
Total	403,771,328	211,700,712	210,875,138

The "Ordinary" expenditure is for pay, provisions, etc., and the general upkeep of the Fleet and its Air Service, and the "Extraordinary" expenditure for new construction and additions and improvements to the present Fleet and its Air Service and establishments.

FRENCH NAVY.

Estimates, 1933–34.

The figures for 1933-34, including the votes for new construction, as compared with previous years, are as follows:—

	1933-34. Francs.	1932-33. Francs.
Ordinary	1,373,183,916	1,094,418,054
Extraordinary	1,339,071,057	1,316,845,523
Total	2,712,254,973	2,411,263,577

ROYAL ITALIAN NAVY.

Estimates, 1933–34.

(July 1, 1933—June 30, 1934.)

	1933-34. Lire.	1932-33. Lire.
Ordinary Expenditure.		
General Expenses . . .	5,299,800	5,264,800
Pensions	98,070,000	99,070,000
Education	—	—
Lighthouses and Pilotage .	6,302,000	6,303,000
Maintenance, Construction, Armaments, Establishments, and Coast Works	1,016,930,000	1,054,960,000
Supplementary	—	—
Total	1,126,601,800	1,165,597,800
Extraordinary Expenditure.		
General expenses of the Navy and Various . .	232,620,477	373,325,477
Transfer of Funds . . .	38,000,000	36,000,000
Total	1,397,222,277	1,574,923,277

GERMANY.

Estimates, 1933–34.

(April 1, 1933—March 31, 1934.)

	1933-34. Reich Marks.	1932-33. Reich Marks.
Gross	186,243,200	187,339,400
Appropriations in aid . .	3,238,050	3,835,050
Nett . .	183,004,350	183,504,350

BRITISH AND FOREIGN NAVIES.

PRINCIPAL OFFICIALS.

Great Britain.

First Lord.—The Right Hon. Sir Bolton M. Eyres Monsell, G.B.E., M.P.
First Sea Lord and Chief of Naval Staff.—Admiral Sir Ernle M. Chatfield, K.C.B., K.C.M.G., C.V.O.
Second Sea Lord and Chief of Naval Personnel.—Vice-Admiral Sir A. Dudley P. R. Pound, K.C.B.
Third Sea Lord and Controller.—Vice-Admiral C. M. Forbes, C.B., D.S.O.*
Fourth Sea Lord and Chief of Supplies and Transport.—Rear-Admiral G. Blake, C.B., D.S.O.
Deputy Chief of Naval Staff.—Vice-Admiral C. J. C. Little, C.B.
Civil Lord.—Captain David Euan Wallace, M.C., M.P.
Parliamentary and Financial Secretary.—Lord Stanley, M.C., M.P.
Permanent Secretary.—Sir Oswyn A. R. Murray, G.C.B.

Foreign Powers.

Country.	Minister of Marine.	Chief of Staff.
Argentina	——	Captain Léon Scasso
Brazil	Vice-Admiral Protogenes Pereira Guimarães	Rear-Admiral Hugo de Roure Mariz
Chile	Don Emilio Bello Codecido (Minister of National Defence)	——
	Rear-Admiral Reyes del Rio (Director-General of the Navy)	Rear-Admiral Luis A. Muñoz Artigas
China	Admiral Chen Shao-Kwan (Minister of Naval Affairs)	——
Denmark	Th. Stauning	
	Vice-Admiral H. Rechnitzer (Chief of Naval Defence and Director of the Naval Ministry)	——
Ecuador	Senor Octavio G. Ycaza	——
Estonia	M. A. Kerem (Minister of Defence)	——
Finland	A. Oksala (Minister of Defence)	——
	Lieut.-General V. Öesterman (Chief of Army and Navy)	
France	M. A. Sarraut	Vice-Admiral G. E. J. Durand-Viel
Germany	General von Blomberg (Minister of Defence)	——
	Admiral Dr. Raeder (Chief of Navy Department (Admiralty))	
Greece	Rear-Admiral (retd.) A. Hadjikyriakos	Captain E. Cavadias
Italy	Signor Mussolini (Under-Secretary, Rear-Admiral Cavagrari)	Vice-Admiral Gino Ducci
Japan	Admiral M. Osumi, C.B.	H.I.H. Prince Hiroyasu Fushimi
Latvia	General Balodis (Minister of Defence)	——
Lithuania	General Daukantas (Minister of War)	——
Mexico	General Plutarco Calles (Minister of War and Marine)	Rear-Admiral P. O. Blanco
Netherlands	Dr. L. N. Deckers (Minister of Defence)	Rear-Admiral J. de Graaff
Norway	J. I. Kobro (Minister of Defence)	Rear-Admiral von der Lippe C.-in-C. and C.N.S.
Paraguay	Dr. Casal Ribeiro	Lt.-Cdr. A. T. Aponte (Director of the Navy)
Peru	Don Alfredo Benevides (Minister of Marine and Aviation)	Captain Carlos Rotalde
Poland	Marshal Pilsudski	Rear-Admiral J. Swirski (Chief of Navy Department)
Portugal	Commander de Mesquita	Rear-Admiral M. Correira
Roumania	General Olteanu (Inspector-General and C.-in-C. of the Navy)	Admiral Buchholtzer
Soviet Union	N. E. Voroshilov (President of Committee of Defence)	——
Spain	Señor Pita Romero	Vice-Admiral Xavier de Salas y Gonzalez
Sweden	Ivar Vennerström (Minister of Defence)	Vice-Admiral Lybeck
Turkey	Captain Houloussi (Under-Secretary for the Navy	——
United States	C. Swanson (Secretary of the Navy)	Admiral W. H. Standley (Chief of Naval Operations)
Uruguay	General Domingo Mendivil (Minister of War and Marine)	——
	Captain Arturo Juambeltz (Director of Navy)	
Yugoslavia	General Radzic (Minister of War and Marine)	Captain I. Rossi-Sabatini
	Vice-Admiral N. Stankovic (Head of the Navy)	

Corrected to December, 1933.

* To be succeeded by Vice-Admiral R. G. H. Henderson, C.B., about April, 1934.

BRITISH AND FOREIGN NAVAL ATTACHÉS.

British Naval Attachés Accredited to Foreign Countries.

To:—

Albania, Bulgaria, Greece, Italy, Yugoslavia, Roumania, and Turkey: Naval Attaché, Captain R. B. Ramsay, R.N. (appointed 28th April, 1931); Assistant Naval Attaché, Commander (E.) F. V. Stopford (appointed 7th March, 1933); Headquarters, Rome, Italy.

Belgium, France, Netherlands, Portugal and Spain: Naval Attaché, Captain J. U. P. Fitzgerald, R.N. (appointed 8th October, 1931); Assistant Naval Attaché, Commander (E.) F. V. Stopford (appointed 7th March, 1933); Headquarters, Paris, France.

Denmark, Esthonia, Finland, Germany, Latvia, Lithuania, Norway, Poland and Sweden: Naval Attaché, Captain G. C. Muirhead-Gould, D.S.C., R.N. (appointed 21st July, 1933); Assistant Naval Attaché, Commander (E.) F. V. Stopford (and Assistant to Naval Attachés, Paris and Rome), (appointed 7th March, 1933); Headquarters, Berlin, Germany.

Japan and China: Naval Attaché, Captain J. G. P. Vivian, R.N. (appointed 6th January, 1933); Assistant Naval Attaché, Commander (E.) G. C. Ross, R.N. (appointed 15th April, 1933): Headquarters, Tokyo, Japan.

U S.A., Cuba, Mexico, and Panama: Naval Attaché, Captain A. R. Dewar, R.N. (appointed 6th May, 1933); Assistant Naval Attaché, Engineer-Commander J. S. Orr (appointed 12th January, 1932): Headquarters, Washington, U.S.A.

South America, including the Argentine Republic, Brazil, Chile, Ecuador, Peru, and Uruguay: Naval Attaché, Captain R. H. C. Hallifax, R.N. (appointed 1st July, 1933).

Foreign Naval Attachés Accredited to Great Britain.

From:—

Argentine Republic: Naval Attaché (none at present): 11 Lowndes Square, S.W.1,

Brazil: Naval Attaché, Engineer-Captain Natal Arnaud: 19, Upper Brook Street, Mayfair, W.1.

Chile: Naval Attaché (none at present): 3, Hamilton Place, Park Lane, London, W.1.

China: Naval Attaché (none at present): 49, Portland Place, W.1.

Denmark: Naval Attaché (Post vacant).

Finland: Commander Väinö Lauri Kopio: 2, Moreton Gardens.

France: Naval Attaché, Capitaine de Frégate, Latham; Address, Albert Gate House, Hyde Park, London, S.W.1.

Germany: Captain Erwin Wassner: 9, Carlton House Terrace.

Greece: Naval and Air Attaché (Post vacant):

Italy: Naval Attaché, Captain Angelo Iachino; Assistant N.A., Engineer-Captain Domenico Bastianini: Address, 4, Three Kings Yard, Davies Street, W.1.

Japan: Naval Attaché, Captain Arata Oka, I.J.N.; Assistant Naval Attaché, Lieutenant-Commander Keizo Komura: Address, 37, Portman Square, W.1.

Peru: Naval Attaché,

Roumania: Commander Gheorghe Niculescu, 4, Cromwell Place, London, S.W.7. Military and Naval Attaché.

Spain: Naval Attaché, Capitan Don Adolfo Hercules de Solás: Address, 24, Belgrave Square, S.W.1.

Sweden: Naval Attaché, Captain E. A. Öberg: Address, Swedish Legation, 27, Portland Place, London, W.1.; Assistant Naval Attaché, Lieutenat G. S. Tham, R.Sw.N., 27, Portland Place, W.1.

United States of America: Naval Attaché, Captain A. L. Bristol, U.S.N.; Assistant Naval Attachés, Captain H. S. Howard (C.C.), Lieutenant Commander G. D. Murray, U.S.N., Lieutenant Commander Howard E. Kingman, U.S.N.; Commander H. D. Bode, U.S.N.: Commander B. H. Wyatt, U.S.N.: Address, 6, Grosvenor Gardens, Westminster, London, S.W.1.

Uruguay: Naval Attaché (Post vacant).

Yugoslavia: Military, Naval and Air Attaché, Brigadier-General Mihailo Nenadovitch (Resident in Paris, 9 Rue Pauquet XVI).

DIMENSIONS AND PARTICULARS

OF

BRITISH AND FOREIGN WARSHIPS.

LIST OF BRITISH AND FOREIGN SHIPS.

Warships are arranged in classes, except in some instances where they are arranged alphabetically. The following abbreviations are used throughout the List:—

a.c.	Armoured cruiser.
a.g.b.	Armoured gunboat.
g.b.	Gunboat.
b.	Battleship.
b.c.	Battle-cruiser.
l.cr.	Light cruiser.
c.d.s.	Coast-defence ship.
M.Cr.	Minelaying cruiser.
cr.	Cruiser.
A.A. or H.A.	Anti-aircraft guns.
A.C.	Aircraft carrier.
A.T.	Aircraft tender.
S.C.	Seaplane carrier.
H.N.S.	Harvey nickel steel.
H.S.	Harveyised or similar hard-faced steel.
K.S.	Krupp steel.
t.	Speed and H.P. at trials (in speed and H.P. columns).
b.p. or p.p.	Length of ship between perpendiculars.
L.	Light guns under 15 cwt., including boats' guns.
M.	Machine guns.

Torpedo Tubes: (D.) = double; (T.) = triple; (Q.) = quadruple; (sub.) = submerged; a.w. = above water.

The following abbreviations are used to distinguish the various types of boilers:—

W.T.	Water-tube boilers, where the type is not known.
B.	Belleville.
Bl.	Blechynden.
B. & W.	Babcock and Wilcox.
D'A.	D'Allest.
My.	Myabara.
Nic.	Niclausse.
Pen.	Penhoet.
T.	Thornycroft.
T.S.	Thornycroft-Schulz.
Y.	Yarrow.

The following abbreviations distinguish types of machinery:—

P.T.	Parsons turbines.
C.T.	Curtis turbines.
B.C.T.	Brown-Curtis turbines.
(G.)	Geared turbines.
tur.	Turbines, where the type is not known.
recip.	Reciprocating engines.
I.C.	Internal combustion engines.

In later pages (marked P1, P2, etc., towards the end of the volume) plans of most of the ships appear.

Unless otherwise stated, the displacements are Standard displacements (*i.e.* excluding fuel and reserve feed water).

GREAT BRITAIN.—Battleships and Battle Cruisers.

Class.	NAME. Date for Scrapping and Replacement under Washington Treaty.§	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Normal Draught.	Horse-Power. Type of Boilers.	Where Built.	Makers of Engines. Type of Machinery.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement Wa
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.	in.	in.	in.	in.			knots.	tons	
b.	**Barham** . . 1935§	31,100	643¾	104 0	31 3	75,000 Y.	Clydeb'nk	J. Brown B.C.T.	1914	1915	2,470,113	13–4	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *4-in.* A.A., 4 *3-pr.*; 5 M.; 11 L.	2 (sub.) 21″	25‖	— / 3425	1126
b.c.	**Hood** . . 1941	42,100	860¾	105 3	28 6	144,000	Clydeb'nk	J. Brown . B.C.T. (G.)	1918	1920	5,698,946*	12–6	3–1	7–5	5–4	11	(*a*)	8 *15-in.*, 12 *5·5-in.*, 4 *4-in.* A.A., 4 *3-pr.*; 5 M.; 11 L.	4 a.w. 2 (sub.) 21″	31	— / 4000	1341
b.	**Malaya¶** . . 1936§	31,100	640¼	104 0	31 3	75,000 B. & W.	Walker .	Wallsend . P.T.	1915	1916	2,945,709	13–6	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *4-in.* A.A., 4 *3-pr.*; 5 M.; 11 L.	2 (sub.) 21″	25‖	— / 3425	1136
b.	**Nelson** . . 1942	33,500	710	106 0	30 0	45,000	N'wc'stle-on-Tyne	Wallsend . B.C.T. (G.)	1925	1927	6,410,071*	14	6¼	..	..	16–9	..	9 *16-in.*, 12 *6-in.*, 6 *4·7-in.* A.A.; 4 *3-pr.*, 6 *2-pr.*; 5 M.; 11 L.	2 (sub.) 24″	23	— / 4000	1360
b.	**Queen Elizabeth** 1935§	31,100	644¼‡	104 0	31 3	75,000 B. & W.	Portsm'th	Wallsend . P.T.	1913	1915	2,473,103	13–4	3–1	6	4–2	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 11 L.	2 (sub.) 21″	25‖	— / 3425	1187

b.	**Ramillies** . 1941		620½	‡102 0			Dalmuir .	Beardmore, P.T.	1916	1917	3,295,810											1010
b.	**Resolution** 1937		620¼	‡101 4			Jarrow .	Palmer . P.T.	1915	1916	2,449,680											1012
b.	**Revenge** . 1937	29,150	625¾	‡101 5	29 0	40,000 Y.	Barrow .	Vickers . P.T.	1915	1916	2,406,368	13-4	4-1	6	6-4	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 11 L.	2 (sub.) 21"	23‖	— 3230	1104
b.	**Royal Oak** 1938		620½	‡102 1			Devonp'rt	Hawthorn P.T.	1914	1916	2,468,269											1149
b.	**Royal Sovereign** 1936§		620¾	‡101 6			Portsm'th	Parsons . P.T.	1915	1916	2,570,504											1104
b.c.	**Renown** . 1940	32,000	794½	102 4	25 6	112,000 B. & W.	Govan .	Fairfield . B.C.T.	1916	1916	3,117,204	9-3 K.C.	2	6-3	4-3	11-7 K.C.	6 K.C.	6 *15-in*, 15 *4-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 11 L.	2† (sub.) 21"	31·5‖	— 4300	1188
b.c.	**Repulse** . 1939			102 6			Clydeb'nk	J. Brown . B.C.T.	1916	1916	2,829,087											1209
b.	**Rodney** . 1942	. 33,900	710	106 0	30 0	45,000	Birkenh'd	Cammell Laird B.C.T.(G.)	1925	1927	6,414,653*	14	6¼	..	..	16	..	9 *16-in.*, 12 *6-in.*, 6 *4·7-in.* A.A.; 4 *3-pr.*; 6 *2-pr.*; 5 M; 11 L.	2 (sub.) 24"	23	— 4000	1315
b.	**Valiant** . 1939	31,100	639¾	104 ‡ 0	31 3	75,000 B. & W.	Govan .	Fairfield . B.C.T.	1914	1916	2,537,037*	13-6	3-1	6	4-2	11	6	8 *15-in.*, 12 *6-in*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 11 L., 1 aircraft	2 (sub.) 21"	25‖	— 3425	1136
b.	**Warspite** . 1935§	31,100	641½	104 ‡ 0	31 3	75,000 Y.	Devonp'rt	Hawthorn P.T.	1913	1915	2,518,360*	13-6	3-1	6	4-2	11	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 11 L.	2 (sub.) 21"	25‖	— 3425	1130

* Total estimated cost of ship including guns. † Repulse has 8 a.w. tubes in addition. ‡ Over rubbers. ¶ Built at the charge of the Federated Malay States.
§ The London Naval Treaty (1930) suspended replacement of capital ships during the years 1931-36 inclusive. ‖ Speed without bulges. Barbam has been in hand since 1930 for bulging and reconstruction.
All other battleships of the "Queen Elizabeth" and "Royal Sovereign" classes have been bulged.
(*a*) Guns are in shields of 1-in. H.T. plating.

GREAT BRITAIN.—Aircraft Carriers.

Class.	Name.	Standard Displacement.	Length. (Extreme.)	Extreme breadth under water over rubbers.	Draught.	Horse-Power. Type of Boiler.	Where Built.	Maker of Engines. Type of Machinery.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. Oil.	Complement (War).
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
A.C.	Argus	14,450	567	75 9	21 0	20,000	Dalmuir	Beardmore P.T.	1917	1918	Purchased under construction	..	..	6 4-in. A.A., 4 3-pr., 4 M., 10 L., accommodates 20 aircraft	—	20·2	— / 2000	360
S.C.	Ark Royal*	6,900	366	50 10	17 6	3000	Blyth	Blyth S. B. Co. recip.	1914	1914	do.	..	..	4 M., 10 L.	—	11	— / 500	139
A.C.	Courageous	22,500	786¼	89 10	22 3	90,000 Y.	Walker† (Armstr'g)	Parsons P.T.(G.)	1916 As cruisers.	1928 As aircraft carriers.	1,785,940 (a) 2,115,944 (b)	3	9-7	16 4·7-in., 4 3-pr., 4 2-pr. Pom Poms, 4 M., 42 L.	—	30½	— / 3800	750
A.C.	Glorious	22,500	786¼	89 10	22 3	90,000 Y.	Belfast†	Harland & Wolff P.T.(G.)	1916 As cruisers.	1930	2,119,066 (a) 2,137,374 (b)	3	9-7	16 4·7-in., 4 3-pr., 4 2-pr. Pom Poms, 4 M., 42 L.	—	30½	— / 3800	750
A.C.	Eagle, ex-Almirante Cochrane.	22,600	667½	105 2	21 11	50,000 Y.	Walker (Armstrong)	J. Brown B.C.T.	1918 As a battleship.	1924 As an aircraft carrier.	4,211,576	.	..	9 6-in., 5 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 32 smaller	—	21	— / 3775	746
A.C.	Furious	22,450	786½	90 1	21 6	90,000 Y.	Walker (Armstrong)	Wallsend Engn'g Co. B.C.T.(G.)	1916 As a cruiser.	1925 As an aircraft carrier.	2,436,603	3 / —	7	10 5·5-in., 3 4-in. A.A., 4 3-pr., 4 2-pr. Pom Poms, 46 smaller	—	31	— / 4010	728
A C.	Hermes	10,850	599½	70 3	18 7	40,000	Elswick	Parsons Co P.T.(G.)	1919	1924	2,030,263‡	..	..	6 5·5-in., 3 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 4 M., 16 L., 15 aircraft	—	25	— / 2000	551

* Used for experimental work. † Reconstructed as aircraft carriers at Devonport dockyard. ‡ Estimated cost including guns.

(a) First cost of ship as a cruiser. (b) Estimated cost of reconstruction as an aircraft carrier.

GREAT BRITAIN.—Cruisers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power. Types of Machinery and Boilers.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement (War).
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
Arethusa Class	Galatea	5,200	..	..	..	..	(Scott) Greenock	..	Bldg.	..	..	..	..	6-in. guns	..	..	..	..
	Arethusa						Chatham	Parsons	,,	est. 1935								
Leander Class	Ajax	7,000	554½ o.a. 522 b.p.	55 8	16 0	72,000 P.T. (G.)	Barrow	Vickers	Bldg.	est. 1935	..	..	..	8 6-in., 4 4-in. A.A., 4 3-pdr. guns, 1 aircraft	8	32½	— / 1800	..
	Achilles						Birkenhead	Cammell Laird	1932	1933								
	Neptune						Portsm'th	Parsons	1933	est. 1934	1,560,414	..	..					
	Orion						Devonport	Vickers-Armstrongs	1932	est. 1934	1,548,663	..	..					
	Leander	..	..	55 2	..	..	Devonp'rt	Vickers-Armstrongs	1931	1933	1,667,819	..	.					
Modified Leander Class	Amphion	7,000	..	..	..	..	Portsm'th	Beardmore	Bldg.	est. 1935	..	..	..	6-in. guns	..	..	..	..
	Apollo						Devonp'rt	Beardmore	..	..								
	Phaeton						Wallsend	Wallsend Slipway	..	..								
M.Cr.	Adventure	6,740	521	59 0	14 5	40,000 tur. and Diesel	Devonp'rt	Vickers	1924	1927	1,246,083	..	..	4 4·7-in. A.A., 4 3-pr., 4 2-pr. Pom Poms; 2 M., 8 L. 310 mines	—	27¾	— / 1520	395
Kent Class	Berwick	9,750	630	68 4	16 3	80,000 (G.) Y.	Govan	Fairfield	1926	1928	2,029,526	..	..	8 8-in., 4 4-in. A.A., 4 3-pr., 4 2-pr. Pom Poms. 4 M., 8 L., 1 aircraft	8 21" (Q)	31½	— / 3200	685
	Cornwall						Devonp'rt	Beardmore	1926	1928	2,252,110*	.	..					
	Cumberland						Barrow	Vickers	1926	1928	1,960,821*	..	..					
Caroline Class	Comus	3,895	446⅓	41 9	13 6	10,000 P.T. Y.	Newcastle (Swan Hunter)	Wallsend Engn'g Co.	1914	1915	380,583	3 / —	..	4 6-in., 2 3-in. A.A., 4 3-pr., 2 2-pr. Pom Poms; 1 M.; 8 L.	4 a.w. 21" (D.)	29	— / 917	368

* Total estimated cost of ship, including guns.

GREAT BRITAIN.—Cruisers—*continued.*

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement (War).
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
	Cairo .						Birken-head	Cammell Laird .	1918	1919	787,479							
	Calcutta .						Barrow .	Vickers .	1918	1919	832,123							
Carlisle Class.	**Capetown**	4200	451¾	43 10	14	1 40,000 (G.) Y.	Birken-head	Cammell Laird .	1919	1922	1,984,720	3 / —	..	5 *6-in.*, 2 *3-in* A.A., 4 *3-pr.* 2 *2-pr.* Pom Poms, 2 M., 8 L.	8 a.w. 21″ (D.)	29	— / 950	415
	Carlisle .						Govan .	Fairfield .	1918	1918	669,216							
	Colombo .						Govan .	Fairfield .	1918	1919	692,308							
	Caledon .						Birken-head	Cammell Laird .	1916		547,300							
Caledon Class	Calypso .	4180	450 –450¼	43 1	14	1 40,000 P.T. (G.) Y.	Newcastle (Hawth'n)	Hawthorn Leslie	1917	1917	529,190	3 / —	..	5 *6-in.*, 2 *3-in.* A.A., 4 *3-pr.*, 2 *2-pr.* Pom Poms, 2 M., 8 L.	8 a.w. 21″ (D.)	29	— / 935	420
	Caradoc .						Green'ck	Scotts' .	1916		534,583							
	Champion						Newcastle (Haw-thorn)	Hawthorn	1915	1915	409,609							
	Cambrian .						Pem-broke	Cammell Laird .	1916	1916	493,518							
Cambrian Class	Canterbury	3920	446½ –447	41 9	13	6 40,000 tur.	Clyde-bank	J. Brown .	1915	1916	300,000†	3 / —	..	4 *6-in.*, 2 *3-in.* A.A., 4 *3-pr.*, 2 *2-pr.*, Pom Poms; 1 M.; 8 L. [Champion 1 *3-in.* A.A., and no *3-pr.*]	2 (sub.) 21″	29	— / 841	368
	Castor .						Birken-head	Cammell Laird .	1915	1915	358,300							
	Constance						Birken-head	Cammell Laird .	1915	1916	374,270							

Ceres Class	Cardiff .								Govan .	Fairfield .	1917	1917	542,507							
	Ceres .								Clydebank	J. Brown .	1917	1917	529,248							
	Coventry .	4290	450–450⅓	43	9	14	1	40,000 (G.) Y.	Newcastle (Swan Hunter)	Swan Hunter	1917	1918	586,182	3/—	..	5 6-in., 2 3-in. A.A., 4 3-pr., 2 2-pr. Pom Poms; 2 M., 8 L. [Cardiff, Ceres, Curacoa 2 3-pr.]	8 a.w. 21" (D.)	29	—/950	430
	Curacoa .								Pembroke	Harland & Wolff	1917	1918	794,201							
	Curlew .								Barrow .	Vickers .	1917	1917	544,436							
	Concord † . .	4120	446⅓	42	3	13	6	40,000 T. Y.	Elswick	Vickers .	1916	1916	300,000*	3/—	..	3 6-in., 2 3-in., A.A., 2 3-pr., 2 2-pr. Pom Poms; 2 M., 8 L.	2 (sub.) 21"	29	—/809	437
D Class	Despatch .								Govan .	Fairfield .	1919	1922	1,016,870							
	Danaë .								Elswick	Armstrong	1918	1918	701,600							
	Dauntless .								Jarrow .	Palmer .	1918	1918	750,025							
	Dragon .	4850	471¼–472¾	46–46	3–9	14	3	40,000 (G.) Y.	Green'ck	Scotts' .	1917	1918	690,083	3/—	Shields	6 6-in., 3 4-in. A.A., 2 M., 4 3-pr., 8 L., 2 2-pr. Pom Poms.	12 a.w. 21" (T.)	29	—/1050	460
	Delhi .								Elswick	Armstrong	1918	1919	785,145							
	Durban .								Green'ck	Scott .	1919	1921	954,667							
London Class	Devonshire .	9750	630	66	0	17	0	80,000 P.T. (G.) Y.	Devonp'rt	Vickers	1927	1929	2,007,275	..	..	8 8-in., 4 4-in. A.A., 4 3-pr., 4 2-pr. Pom Poms, 4 M., 8 L., 1 aircraft.	8 a.w. 21" (Q.)	32¼	—/3200	685
Norfolk Class	Dorsetshire .	9900	633	66	0	17	0	80,000 (G.)	Portsmouth	Cammell Laird	1929	1930	2,101,951	..	..	8 8-in., 4 4-in. A.A., 4 3-pr., 4 2-pr. Pom Poms, 4 M., 8 L, 1 aircraft.	8 21" (Q.)	32¼	—/3200	685

* Estimated cost as originally designed.

† Centaur of this class is paid off into dockyard control.

GREAT BRITAIN.—Cruisers, &c.—*continued.*

Class.	NAME.	Standard Displacement.	Length (Extreme.)	Beam (Extreme.)	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement (War).
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
Improved Birmingham Class	Effingham .	9770	605	65 2	17 3	65,000 (G.) Y.	Portsmouth	Harland & Wolff	1921	1925	2,138,999	3 / —		7 7·5-*in.*, 3 4-*in.* A.A., 4 3-*pr.*, 2 2-*pr.*, 2 M., 8 L.	4 a.w. 1 sub.	30½	— / 2170	713
	Frobisher ‡ .	9860		65 1			Devonport	Wallsend Eng. Co.	1920	1924	2,035,915†		Shields	6 7·5-*in.*, 2 4-*in.* A.A., 4 3.-*pr.*, 2 M., 8 L.	2 sub.	30½		715
E Class	Enterprise .	7580	570	54 9	16 6	80,000 B.C. (G) Y.	Clydebank	John Brown	1919	1926	1,690,658*	3-1½ / 1	..	7 6-*in.*, 3 4-*in.* A.A., 4 3-*pr.*, 2 2-*pr.* Pom Poms, 2 M., 8 L., 1 aircraft.	16 21″ (Q.)	33	— / 1750	577
	Emerald .	7550		54 7			Elswick	Armstrong	1920	1926	1,617,120							
York Class	Exeter .	8390	575	58 0	17 0	80,000 (G.) Y.	Devonp'rt	Parsons .	1929	1931	1,837,415*	..	..	6 8-*in.*, 4 4-*in.* A.A., 4 3-*pr.*, 2 2-*pr.*, 4 M., 8 L., 2 aircraft.	6 21″	32	— / 1900	..
Improved Birmingham Class	Hawkins .	9800	605	65 1	17 3	55,000 (G.) Y.	Chatham	Parsons Co.	1917	1919	1,599,741	3 / —	Shields	7 7·5-*in.*, 4 4-*in.* A.A., 4 3-*pr.*, 2 2-*pr.* Pom Poms; 2 M., 8 L.	4 a.w. 2 sub.	29½	— / 2680	747
Kent Class	Kent .	9850	630	68 4	16 8	80,000 (G.) Y.	Chatham	Hawthorn Leslie	1926	1928	2,084,213†	..	..	8 8-*in.*, 4 4-*in.* A.A., 4 3-*pr.*, 4 2-*pr.* Pom Poms; 4 M., 8 L., 1 aircraft.	8 21″ (Q.)	31½	— / 3200	685
London Class	London .	9750	630	66 0	17 0	80,000 P.T. (G.)	Portsmouth	Fairfield .	1927	1929	2,029,949*	..	..			32¼	— / 3200	685
Norfolk Class	Norfolk .	9850	633	66 0	17 0	80,000 (G.)	Fairfield	Fairfield .	1928	1930	2,141,961*		..	8 8-*in.*, 4 4-*in.* A.A., 4 3-*pr.*, 4 2-*pr.* Pom Poms, 4 M., 8 L., 1 catapult, 1 aircraft.	8 21″ (Q.)	32¼	— / 3200	685

London Class	Shropshire	9730	633	66	0	17	0	80,000 (G.)	Dalmuir	Beardmore	1928	1929	1,941,950†	..	..	8 8-in., 4 4-in. A.A., 4 3-pr., 4 2-pr. Pom Poms, 4 M., 8 L., 1 aircraft	8 21" a.w. (Q.)	32¼	—/3200	685
	Sussex	9730	633	66	0	17	0	80,000 (G.)	Hawthorn Leslie	Hawthorn Leslie	1928	1929	1,975,800†	..	..					
Kent Class	Suffolk	9800	630	68	5	16	3	80,000 (G.)	Portsmouth	Parsons	1926	1928	2,180,240†	..	..			31½	—/3200	685
Improved Birmingham Class	Vindictive	9996	605	65	1	17	3	60,000 (G.) Y.	Belfast	Harland & Wolff	1918	1918	1,671,712	3/—	Shields	6 7·5-in., 3 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 2 M., 8 L.	4 a.w. 2 sub. 21"	30	800/1420	720
York Class	York	8250	575	57	0	17	0	80,000 P.T. (G.) Y.	Palmers'	Palmers'	1928	1930	1,774,276	..	..	6 8-in., 4 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 4 M., 8 L., 1 aircraft	6 21" (T.)	32¼	—/1900	623

* Total estimated cost of ship, including guns. † Estimated cost, excluding armament and ordnance stores. ‡ Now employed as Cadets' Seagoing Training Ship.

Three cruisers—two of 9,000 tons and one "Arethusa" type—(1933 programme) are authorised for commencement in 1934. These cruisers constitute the fourth and final instalment of the replacement programme due for completion by December 31, 1936, under the terms of the London Naval Treaty (1930).

Patrol Boats.—P.C. (converted patrol) 74, Dart (1918), 610 tons, 20 knots, 1 4-in., 2 12-pr.; P.59 (1917), P.40 (1916), Spey (1917), 560 tons, 20 knots, 1 4-in., 1 2-pr.

Training Ships and Gunnery Drill Ships (ex-Monitors).—Erebus, 7,200 tons; Terror, 7,200 tons; Marshal Soult, 6,400 tons.

Fishery Protection Gunboats (ex-trawlers).—Colne, Doon, Dee, Garry, Kennet, Liffey, 490–550 tons, 11 knots, reciprocating machinery, 1 12-pr. gun.

Destroyer Depôt Ships.—Greenwich (1916), 8,100 tons; Sandhurst (converted 1916), 11,500 tons; Woolwich (1932 programme), building at Fairfields.

Submarine Depôt Ships.—Lucia, 5,800 tons; Titania, 5,250 tons; Alecto, 935 tons; Dolphin, 4530 tons; Cyclops, 11,300 tons; Medway (Vickers', 1929), displacement 14,650 tons, speed 15 knots, armament 2 4-in., 4 4-in. A.A. One more (Maidstone) was authorised for commencement under the 1928-29 Estimates, but construction cancelled in 1929.

Repair Ships.—Assistance (1903), 9,600 tons; Resource (Vickers', 1930), displacement 13,500 tons, speed 15 knots, armament 4 4-in. A.A.

Minelayers (ex-Monitors), 1915.—Medea, 540 tons, 12 knots, 44 mines; Medusa, Melpomene, Minerva, 355 tons, 10 knots, 52 mines; (ex-trawlers) Vernon, 430 tons; Kate Lewis, 308 tons, 24 mines.

Surveying Vessels.—Beaufort, Fitzroy, Flinders, and Kellett, 800 tons, 16 knots, 1 3-pr.; Herald, Ormonde, and Iroquois, 1,650 tons, 15½ knots, 1 3-pr.; Endeavour, 1280 tons, 13 knots, 1 3-pr.; Challenger (Chatham, 1931—originally intended as a fishery investigation vessel), 11,40 tons, 1,200 H.P. (recip.), 12½ knots.

Netlayer and Target Towing Vessel.—Guardian (Chatham, 1931–3), 3,050 tons, 6,500 H.P., 18 knots, 2 4-in. A.A.

Mining School (Vernon) Tender.—Nightingale (Portsmouth, 1931), Skylark (Portsmouth, 1932), displacement 275 tons, horse-power 400, speed 10 knots, coal capacity 15 tons.

Boom Defence Vessels.—Moorgate (Bow, McLachlan, 1931), 325 tons, 1 4-in. gun; Bishopsgate (Henry Robb, 1932) and Aldgate (1933). A boom defence vessel and a boom working vessel authorised, 1933 programme.

Tenders.—(For Submarine depot, Portland), Elfin (1933), 222 tons, 250 H.P., 9¼ knots. (For Torpedo School) Redwing (1933), 225 tons, 250 H.P., 9¼ knots.

Gunnery Training Ship.—Battleship Iron Duke has been de-militarised under the London Treaty and converted to a Gunnery Training Ship (1931–32).

Fleet Target Ship.—Centurion (ex-battleship), 23,000 tons.

Auxiliaries.—Tugs, Trawlers, Drifters, Hospital Ship (Maine, 10,100 tons), Oilers, Store ships, etc,

For sloops, minesweepers and river gunboats, see Flotilla tables, pp. 277–83.

Defence Forces of the Dominions.

ROYAL AUSTRALIAN NAVY.

Under Control of the Australian Naval Board.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Maker of Engines.	Date of Launch	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal. / Oil	Complement (War)
		tons.	ft.	ft. in.	ft. in.						£	in.	in.			knots	tons.	
Kent Class Cruisers	Australia . Canberra .	9870 9850	630	68 4	16 3	80,000 B.C. (G.) Y.	Brown Clydebank	Brown	1927	1928	..	..	..	8 8-in., 4 4-in. A A., 4 3-pr., 4 2-pr. 4 M., 12 L., Pom Pom	8 21" a.w. (Q.)	$31\frac{1}{2}$	— / 3200	685
Adelaide Type Cruiser	Adelaide	5100	$462\frac{1}{2}$	50 1	15 10	25,000 P.T. Y.	Sydney	Sydney	1918	1922	..	3 / —	..	9 6-in., 4 3-pr., 1 3-in. A.A., 10 L., 2 M.	2 (sub.) 21"	25·5	951 / 558	450
Chatham Type Cruiser	Brisbane .	5120	457	49 10	15 9	25,000 P.T. Y.	Sydney	Vickers T.	1915	1916	..	3 / —	..	8 6-in., 4 3-pr., 1 3-in. A.A., 8 L., 2 M.	2 (sub.) 21"	25·5	1196 / 260	490
Seaplane Carrier	Albatross .	4800	$443\frac{3}{4}$	61 0	15 6	12,000 P.T. (G)	Cockatoo Island	Sydney	1928	1929	—	—	—	4 4·7-in. A.A., 4 2-pr. Pom Pom, 4 3-pr. 4 M., 20 L., 6 seaplanes	—	21	— / 1000	350
Flotilla Leader	Anzac .	1310	$327\frac{1}{2}$	31 10	11 1	36,000 B.C.T.	Dumbarton	Denny .	1917	1917	—	—	—	4 4-in. Q.F., 2 2-pr. A.A. 1 M., 4 L.	4 21" (D.)	34	515 Oil	146
„ „	Stuart .	1530	$332\frac{1}{2}$	31 9	12 3	40,000	Hebburn	Hawthorn Leslie	1918	1918	—	—	—	5 4·7-in., 1 3-in. A.A., 7 M. & L.	6	$36\frac{1}{2}$	500 Oil	182

Destroyers.—"*V*" *Class*:—Vampire, Vendetta, Voyager, Waterhen. Completed, 1917–18; Displacement, 1,090 tons; 27,000 H.P.; speed, 34 knots; armament, four 4-in.; 6 smaller guns, 6 torpedo tubes.

"*S*" *Class*:—Stalwart, Success, Swordsman, Tasmania, Tattoo. Completed, 1919; Displacement, 905 tons; 27,000 H.P.; speed, 36 knots; armament, three 4-in., one 2-pdr., 2 double 21" torpedo tubes.

Surveying Vessel: Moresby (late Silvio) (1918), 1650 tons, length $267\frac{1}{2}$ ft., 2,500 H.P., 17 knots, one 3-pr.

Depôt and Fleet Repair Ship: Penguin (late Platypus) (J. Brown, Clydebank, 1917). Displacement 3,455 tons, 14 knots, 1 4-in.

NEW ZEALAND NAVY.

Under the control of New Zealand Naval Board.

LIGHT CRUISERS—"*D*" *Class*:—Dunedin; completed, 1919 (Elswick). Diomede; completed 1922 (Vickers). Displacement, 4,850 tons; 40,000 H.P.; speed, 29 knots; armament, 6 6-in., 3 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 2 M., 4 triple 21-in torpedo tubes; max. fuel, 1,060 tons oil; complement, 450.

TRAINING AND DEPOT SHIP.—Philomel (2570 tons). TRAWLER.—Wakatura.

The SLOOPS Veronica and Laburnum (see page 282) are allocated to the station.

ROYAL CANADIAN NAVY.

Under control of the Canadian Department of National Defence.

DESTROYERS.—Champlain (ex-Torbay) and Vancouver (ex-Toreador). Completed, 1919 (Thornycroft). Displacement, 905 tons; 29,000 H.P.; speed, 36 knots; armament, 3 4-in., 1 2-pr., 4 21-in. tubes; oil, 305 tons (radius of action, 2,000 at 15 knots). Saguenay and Skeena completed at Thornycroft's in 1931; displacement, 1330 tons; 32,000 H.P.; speed, 35 knots; armament, 4 4·7-in., 2 2-pr., 2 quad. 21-in. torpedo tubes; oil, 380 tons.

DEPOT SHIPS.—Naden and Stadacona. MINESWEEPING TRAWLERS.—Festubert, Ypres, and Armentieres (1918), 360 tons.

SOUTH AFRICA.

SURVEYING SHIP.—"*Beaufort*" *Class*:—Protea (ex-Crozier). Twin-screw minesweeper, converted 1919. Displacement, 800 tons; 2,200 H.P. (reciprocating machinery); speed, 16 knots; coal capacity, 185 tons; armament, one 3-pr. Transferred to South Africa, September, 1921. (Paid off for sale, 1933).

DEPOT SHIP.—Afrikander. MINESWEEPING TRAWLERS.—Sonneblom and Immortelle (1918), 335 tons. (May be returned to R.N.).

ROYAL INDIAN MARINE.

MINESWEEPING SLOOPS.—Clive, 2,021 tons; 1,700 H.P.; 14½ knots; 2 4-in., 2 2-pdr., 4 3-pdr. guns; launched Beardmore, 1919. Lawrence, 1,259 tons; 1,900 H.P.; 15 knots; 2 4-in., 2 12-pdr., 4 3-pdr. guns; launched Beardmore, 1919. Hindustan, Swan Hunter (1930). Displacement, 1,190 tons; 2,000 H.P.; speed 16 knots; 2 4-in. guns. A new vessel, Indus, is building at Hawthorn Leslie's.

SLOOPS.—Cornwallis, 1,350 tons; 16½ knots; 2,500 H.P.; 3 4-in., 2 2-pdr., 4 3-pdr. guns (launched Hamilton, 1917, as the Lychnis).

SURVEYING SHIPS.—Investigator (Vickers, 1907), 1,172 tons; 1,550 H.P.; 13 knots; no guns. Palinurus (Cammell Laird, 1907), 444 tons; 475 H.P.; 11½ knots: no guns.

PATROL BOATS.—Baluchi (ex-P.C. 55), 682 tons; Pathan (ex-P.C. 69), 695 tons; both 3,500 H.P., 20 knots, and 1 4-in. and 2 12-pdr. guns; completed, 1917 and 1918.

DEPOT SHIP.—Dalhousie (1886), 1960 tons; 4 3-pdr. guns.

TRAWLER (target towing).—Madras, 588 tons; 480 H.P.

ARGENTINE REPUBLIC.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c. / c.	Almirante Brown / Vintecinco de Mayo	6495	545¾	58	16¼	85,000 Y. (G.)	Leghorn . / Genoa .	1929	1931	1,250,000	..	1″	..	..	..	..	6 7·5-in., 12 4-in. A.A., 6 Pom Poms, 1 catapult, 2 seaplanes.	6 21″	32	— / 2000	600
c.d.s.	General Belgrano†	6100	328	59¾	24	13,000	Leghorn .	1897	1899	696,700	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 10-in., 8 6-in., 4 6-pr.	—	20	oil	515
c.d.s.	General San Martin†	6100	328	59¾	24	13,000	Leghorn .	1896	1898	688,200	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	4 8-in., 6 4·7-in.	—	20	oil	431
c.d.s.	Pueyrredon † . .	6100	328	59¾	24	13,000	Sestri Ponente	1898	1901	782,000	6–3 H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	2 10-in., 8 6-in., 4 6-pr.	—	20	oil	430
b.	Moreno . . / Rivadavia .	27,940	585	95½	28	45,000* (G.)	Camden, N.J. (N.Y.S.B.Co.) / Quincy, Mass.	1911	1915 / 1914	2,200,000	12–10 K.S.	3–2	9–6 K.S.	9 K.S.	12–9 K.S.	6 K.S.	12 12-in., 12 6-in., 4 3-pr., 6 M., 4 L.	2 (sub.) 21″	22·5	— / 4200	1046

The old coast-defence ironclads Libertad and Independencia, 2595 tons, completed at Birkenhead in 1892–93, and converted to oil fuel in 1927, **carry two 9·4-in.,** four 4·7-in., and four 3-pr. guns. The Libertad is unserviceable at present, but is being refitted.

River gunboats Paraná and Rosario (Elswick, 1909), 1055 tons, two 6-in. howitzers, six 3-in., 2 L., 15 knots.

The training-ship (cruiser) (Birkenhead, 1896; refitted 1926), Presidente Sarmiento, 2850 tons, 15 knots; four 4·7-in., four 6-pr., two 3-pr.

Sloops (surveying vessels), San Juan and San Luis (Hawthorn Leslie, Newcastle, 1928), 790 tons, 1—3-in. 12 knots. Alferez Mackinlay (1914), 783 tons, 10 knots.

Tugs, Mataco, Toba (completed 1928, at Messrs. Hawthorn Leslie's, Newcastle), Azapardo (1919), Ona, Querandi (Thornycroft, 1914), and 12 others.

Nine Minesweepers (ex-German), seven transport and other auxiliaries.

One cruiser, three sloops, two transports and four coastguard vessels are projected.

* Moreno and Rivadavia were converted to oil burning and fitted with geared turbines in 1925. † Converted to oil burning and armament altered in 1929.

BRAZIL.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkheads.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.	**Floriano**	3162	267½ p.p.	48	13¼	3400	La Seyne	1897	1901	..	13½–4 H.S.	1½	..	..	8 H.S.	3 H.S.	2 *9·4-in.*, 4 *4·7-in.*, 2 M., 4 *6-pr.*	—	15·0	246 / —	260
b.	**Minas Geraes** *	19,200	543	83	25	25,000 t B.&W.	Elswick	1908	1909	1,821,400	9–6–4 K.S.	2	9–6–4 K.S.	9	12–8 K.S.	9 K.S.	12 *12-in.*, 12 *4·7-in.*, 6 *3-pr.*, 2 *3-in.* A.A.; 4 M.	—	21	2360 / 350	850
b.	**São Paulo**						Barrow	1909	1910												
cr.	†**Bahia**	3100	410½	39	13¼	22,000 B.C.T. (G.) Th.	Elswick	1909	1910	..	..	..	..	..	..	..	10 *4·7-in.*, 4 *3-pr.*	4 21″	27	Oil	450
cr.	†**Rio Grande do Sul**																				

* In hand for re-conditioning and conversion to oil fuel. Being fitted with new oil-burning water-tube boilers by Thornycrofts.

† Reconstructed, including conversion to oil fuel, at Rio de Janeiro, 1926.

River Gunboats.—Missões, 200 tons, 11 knots; Oyapock, 195 tons, 14 knots.
Gunboats.—Almirante Bastos dos Reis and Almirante Brasil; ordered in 1931.
Minelayers.—Maria do Couto, Carneiro da Cunha, Heitor Perdigao and Muniz Freire.
River Monitor.—Pernambuco, 470 tons, 11 knots, built at Rio de Janeiro.
Gunboat Scout.—Victoria (ex-Espirito Santo), 470 tons.
Submarine Tender.—Ceará (Spezia, 1916), 4000 tons, 4100 H.P., 14 knots, four 4-in. guns.
Armed Transport.—Belmont (ex-German SS. Valesia), 5227 tons gross.
Training Ship.—Saldanha Dagama, building at Vickers'. A four-masted schooner, 3325 tons, 262 feet in length, four 4-in. and one 3-in. A.A. guns.

A decree signed on June 11, 1932, established a credit of 480,000 contos (about £10,000,000), spread over 12 years for renewing the Brazilian Navy. Details of the programme are not yet settled.

CHILE.—Armoured Ships.

Class.	NAME	Normal Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Almirante Latorre** * (ex-H.M.S. Canada)	33,200	661	92 6	29 0	37,000 P.T. Y.	Elswick	1913	1915	..	9–4	4–2½	4½	..	10	6	10 *14-in.*, 14 *6-in.*, 2 *3-in.*, A.A., 4 *3-pr.*, 1 catapult.	4 (sub.) 21″	23	Oil.	1000
a.c.	**General O'Higgins**	8,500	412 p.p.	62 9	22 0	16,000 B.	Elswick	1897	1898	..	7–5	2	..	..	7½–6	6	4 *8-in.*, 10 *6-in.*, 12 *3-in.*, 4 M.	—	21·5 *t*	1200 / —	500
b.	**Capitan Prat** †	7,287	328 p.p.	60 9	22 9	12,000	La Seyne	1890	1893	391,000	12	3	4	..	10½	2	4 *9·4-in.* (Canet), 8 *4·7-in.* (Canet), 8 *6-pr.*, 11 M.	2 18″	18	775 / —	500

* Fitted with bulges, converted to oil burning, and modernised in England (completed 1931). † Submarine parent ship.

Cruising Ships.

Class.	NAME	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						in.	in.			knots.	tons.	
cr.	**Blanco Encalada**	4420	370 p.p.	46 6	19 6	14,500	Elswick	1893	1894	..	4–1¾	..	2 *8-in.*, 8 *6-in.*, 5 *3-in.*	—	22·78 *t*	850 / —	385
”	**Chacabuco**	4500	360 p.p.	46 6	17 0	15,500	Elswick	1901	1903	..	4½–1¾	..	2 *6-in.*, 10 *4·7-in.*, 5 *3-in.*	—	24·0	1000 / —	400

Oilers (Armstrongs, 1930): Maipo, 4,686 tons gross; Rancagua, 3,080 tons displacement, two 4·7-in. guns. Coastguard Vessels: Orompello, Leucoton, Elicura, Colocolo, 580 tons; Aguila, 820 tons; Porvenir, 450 tons. Sibald, Yelcho, Micalvi, Condor, and Yanez. Submarine Depot Ship: Araucano (Vickers-Armstrongs, Barrow), completed 1930; displacement 6,500 tons; armament two 4·7-in.; length b.p. 390 ft.; beam 55 ft.; draught 16 ft. 6 ins.; speed 13 knots; H.P. 2,500.

Training Ship.—General Baquedano (1898), 2350 tons, four 4-in. guns. Two tugs. Two towing launches.

Two cruisers are projected.

DENMARK.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed	Fuel. Coal. Oil.	Complement.
		tons.	ft. ins.	ft. ins	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Niels Juel**	3400	295 4	53 6	15 9	5500	Copenhagen	1918	1923	..	8–4 K.S.	2	..	..	..	2 K.S.	10 *5·9-in.*, 2 *6-pr.*, 4 *6-pr.* A.A.	2 (sub.) 18″	17·0	240 / 250	309
c.d.s.	**Olfert Fischer**	3415	283 9	50 6	16 9	4600 t	Copenhagen	1903	1905	..	7–4	3	..	..	7	6	2 *9·4-in.*, 4 *5·9-in.*, 6 *3-in.*, 2 *6-pr.* A.A., 2 *1-pr.*, 2 M.	3 (sub.) 18″	16·0	250 / —	256
c.d.s.	**Peder Skram**	3515	286 7	51 6	16 3	5400	Copenhagen	1908	1909	..	8–4 K.S.	2	..	..	7 K.S.	6 K.S.	2 *9·4-in.*, 4 *5·9-in.*, 8 *3-in.*, 2 *1-pr.*, 2 *3-in.* A.A., 2 M.	4 (sub.) 18″	16 0	250 / —	262

Mine-layers: Lossen, 600 tons, 13 knots, 175 mines; Minekran v and vi, 186 tons, 8 knots, 60 mines; Mining boats 1–10. Groensund, torpedo boat repair ship (Diesel-electric drive); Hekla, submarine depôt ship. Submarine depôt and repair ship Henrik Gerner completed 1928, displacement 490 tons, 2450 H.P., 13 knots, carries two 3-in. guns. Fishery protection vessels: Aegir, Odin, Thor (Iceland Government), Hvidjörnen, Diana, Fenris, Island Falk, Fylla (ex-British sloop Asphodel), Beskytteren, Maagen; Ingolf (building, to replace Fylla) 3000 H.P., two 4·7 in. and two 6-pdr. guns.

Surveying vessels Marstrand and Willemoes, 158 tons, 11 knots.

Six minesweepers (ex-Torpedo boats *), 96 tons. Five patrol vessels (ex-Torpedo boats *), 96 tons.

* See Flotilla Tables.

FRANCE.—Battleships and Armoured Cruisers.

Class.	NAME. Date for Scrapping and Replacement under Washington Treaty (1922).*	Standard Displacement.	Length. (Extreme.)		Beam.		Draught.		Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal. Oil.	Complement.
		tons.	ft.	ins.	ft.	ins.	ft.	ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Bretagne** . 1934	22,189	544	6	88	6	29	0	29,000 Nic. P.T.	Brest .	1913	1915	2,589,439	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 4 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 L.	4 (sub.) 18″	20·0	2700 / 800	1167
b.	**Condorcet** .	17,597	480	11	84	7	27	0	22,500 Nic. P.T.	St. Nazaire	1909	1911	2,165,200	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.* A.A., 2 *1-pr.*, 2 L.	2 (sub.) 18″	19·25	2100 / —	890
b.	**Courbet** . . 1930	22,189	544	6	88	6	29	0	28,000 Nic. P.T.	Lorient .	1911	1913	2,508,388	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 3 *3-pr.*, 4 *3-in.* A.A., 2 *1-pr.*, 2 L.	4 (sub.) 18″	20·0	2450 / 250	1140
b.	**Diderot** . .	17,597	480	11	84	7	27	0	22,500 Nic. P.T.	St. Nazaire	1909	1911	2,167,000	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 2 *3-in.* A.A., 2 *3-pr.* A.A., 2 *1-pr.*, 2 L.	2 (sub.) 18″	19·25	2100 / —	890
b.	**Dunkerque** .	26,500	685	0	102	0	.		100,000 -120,000	Brest .	Bldg.	Bldg.	5,200,000	†	..	..	..	..	..	8 *13-in.*, 16 *6·1 in.*, 40 *smaller*	..	abt. 29	..	..
a.c.	**Ernest Renan**	12,234	521	7	70	0	27	6	37,600 Nic. Recip.	St. Nazaire	1906	1909	1,410,000	6¾–4 H.S.	2	5–3 H.S.	4¾	6 H.S.	5 H.S.	4 *7·6-in.*, 12 *6·5-in.*, 2 *3-in.* A.A., 4 *3-in.*, 8 *9-pr.*, 2 *1-pr.*	2 (sub.) 18″	24·4 *t*	1870 / —	874
b.	**Jean Bart** . 1930	22,189	544	6	88	6	29	0	28,000 B. P.T.	Brest .	1911	1913	2,528,888	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*, 4 *3-in.* A.A., 2 *1-pr.*, 2 L.	4 (sub.) 18″	20·0	2450 / 250	1140
a.c.	**Jules Michelet**	11,072	489	0	70	3	27	0	30,000 Guyot Recip.	Lorient .	1905	1908	1,204,107	6–4 K.S.	2	5–3 K.S.	6 H.S.	8 K.S.	5 K.S.	4 *7·6-in.*, 12 *6·5-in.*, 2 *3-in.* A.A., 10 *3-pr.*, 2 M.	2 (sub.) 18″	22·8	1870 / —	724

b.	**Lorraine** 1936	22,189	544	6	88	6	29	0	29,000 B. P.T.	St. Nazaire	1913	1916	2,642,439	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 4 *3-in.* A.A., 4 *3-pr.*, 2 *1-pr.*, 2 L.	4 (sub. 18"	20·0	2700 / 300	1167
b.	**Paris** 1934	22,189	544	6	88	6	29	0	28,000 N. P.T.	La Seyne	1912	1914	2,603,920	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*, 4 *3-in.* A.A., 2 *1-pr.*, 2 L.	4 (sub.) 18"	20·0	2450 / 250	1140
b.	**Provence** 1935	22,189	544	6	88	6	29	0	29,000 P.T.	Lorient	1913	1915	2,589,000	11 7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 4 *3-in.* A.A., 4 *3 pr.*, 2 *1-pr.*, 2 L.	4 (sub.) 18"	20·0	2700 / 300	1167
b.	**Voltaire**	17,597	480	11	84	7	27	0	22,500 B. P.T.	La Seyne	1909	1911	2,169,200	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 2 *3-in.* A.A., 2 *3-pr.*, 2 *1-pr.*, 2 L.	2 (sub.) 18"	19·25	2100 / —	890
a.c.	**Waldeck-Rousseau**	12,617	521	4	70	7	27	6	35,286 Nic. *t.* recip.	Lorient	1908	1910	1,301,380	6½–3½	2½	5	4¾	6	5½	14 *7·6-in.*, 10 *3-in.*, 10 *9-pr.* A.A., 2 *3-pr.*, 2 M.	2 (sub.) 18"	23·0 †	1900 / —	874

* The London Naval Treaty (1930), suspended the replacement of capital ships during the years 1931—36 inclusive. † Reported to be not less than 9 inches.

All the above battleships were reconstructed and modernised between 1923 and 1930.
Since 1930 all except Diderot, Condorcet and Voltaire have been taken in hand for conversion to oil-fuel burning.

Aircraft Carriers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)		Beam.		Draught.		Horse-power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ins.	ft.	ins.	ft.	ins.					£	in.	in.			knots.	tons.	
A.C.	Bearn *	22,146	597	1	89	0	29	10	37,000	Chantiers de la Mediterranée, La Seyne	1920	1928	..	3¼	..	8 *6·1-in.*, 6 *3-in.* A.A., 8 *1-pr.* A.A., 12 M. A.A., 41 planes	4 21·7"	21·5	— / 2070	875
Aircraft Transport	Commandant Teste	10,000	548	0	88	7	23	6	21,000 †	Chantiers de la Gironde, Bordeaux	1927	1932	..	2 / 1½	..	12 *3·9-in.* A.A., 8 *3-pr.* A.A., 12 M., 19 planes, 4 catapults, 5 cranes.	—	20·5	oil	648

* Originally designed and laid down as a battleship. † Schneider-Zoelly turbines (G.). Yarrow-Loire S.T. boilers.

FRANCE.—Cruisers.

(See pages 246-7 for the armoured cruisers Ernest Renan, Jules Michelet and Waldeck-Rousseau.)

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft. ins.					£	in.	in.			knots.	tons.	
Training cruiser	**Jeanne d'Arc**	6496	557 8	58 0	18 8	32,000	Penhoet Yard, St. Nazaire	1930	1931	..	..	..	8 *6·1-in.*, 4 *3-in.* A.A., 2 *1·6-in.*, 2 M., 2 seaplanes	2 21·7″	26	..	506
1931–32 *pr.*	**Jean-de-Vienne**	7600	590 0	57 5	16 5	84,000	Lorient	1933	Bldg.	..	..	..	9 *6-in.*, 8 *3·5-in.* A.A.	4	31	..	..
	La Galissonnière						Brest										
1932–33 *pr.*	**Marseillaise**						Ch. de la Loire, St. Nazaire										
	Gloire	7600	..	..	..	..	Bordeaux	Bldg.	Bldg.	..	..	..	9 *6-in.*, 8 *3·5-in.* A.A.	4	31	..	..
	Montcalm						La Seyne										
	Georges Leygues						Penhoet Yard, St. Nazaire										
—	**Algérie**	10,000	607 0 b.p.	63 0	20 0	84,000 (G.) Pen.	Brest	1932	Bldg.	1,920,000	about 4	..	8 *8-in.*, 12 *3·9-in.* A.A., 8 *1·5-in.*, 16 M., 2 catapults, 2 seaplanes	2 triple 21″	31	oil	746
Suffren Class	**Dupleix**							1930	1932	1,570,000							
	Foch	10,000	607 0 b.p.	63 0	20 7	90,000 (G.)	Brest	1929	1931	1,450,000	..	..	8 *8-in.*, 8 *3·5-in.* A.A., 8 *1-pr.* A.A., 12 M., 3 seaplanes, 2 catapults.	2 triple 21″	32	oil	605
	Colbert							1928	1931	1,270,000							
	Suffren	10,000	607 0 b.p.	63 0	20 7	90,000 (G.)	Brest	1927	1930	1,210,000	..	..	8 *8-in.*, 8 *3-in.* A.A., 8 *1-pr.* A.A., 12 M., 3 seaplanes, 2 catapults	2 triple 21″	32	— / 1800	605
Duquesne Class	**Tourville**	10,000	626 8	62 4	20 7	120,000 (G.)	Lorient	1926	1928	..	..	..	8 *8-in.*, 8 *3-in.* A.A., 8 *1-pr.*, 2 seaplanes, 1 catapult	2 triple 21″	33·2	— / 2000	620
	Duquesne						Brest	1925									
Duguay-Trouin Class	**Duguay-Trouin**						Brest	1923	1926								
	Primauguet	7249	594 10	56 6	17 0	110,000 (G.)	Brest	1924	1927	..	..	..	8 *6·1-in.*, 4 *3-in.* A.A., 2 *3-pr.*, 2 M., 1 L., 1 seaplane, 1 catapult	4 triple 21·7″	33	— / 1480	578
	La Motte Picquet						Lorient	1924	1927								

cr.	**Metz** (*ex*-German Königsberg)	5264	496	11	47	0	16	6	36,400 tur.	Bremen(Weser)	1915	1916	..	2½	1	8 *5·9-in.*, 2 *3-in.* A.A., 4 M. 200 mines	2 sub. 2 a.w.	27	1270 / 500	433
„	**Strasbourg** (*ex*-German Regensburg)	4723	468	1	45	0	17	0	S.T. 26,000 32,500t P.T.	Bremen(Weser)	1914	1914	417,810	1–2½	2	7 *5·9-in.*, 1 *3-in.* A.A., 4 M., 120 mines.	4 19·7" a.w.	26·0	1200 / 423	438
„	**Thionville** (*ex*-Austrian Novara)	2922	428	7	42	0	15	6	25,000 tur.	Fiume	1913	1914	..	2½	..	9 *3·9-in.*, 2 *3-in.* A.A., 1 M.	2 twin a.w.	27·0	800 / —	430
M.Cr.	**Emilé Berlin**	5886	580	0	52	5	16	4	100,000–120,000 P.T.(G.)	Penhoet, St. Nazaire	1933	Bldg.	..	..	..	9 *6-in.*, 4 *3·5-in.* A.A., 8 *1-pr.*, 250 M., 1 catapult, 1 aircraft.	6 21·7" a.w. (T.)	34·0	oil	550
„	**Pluton**	4773	472 b.p.	0	50	0	17	0	57,000 (G.)	Lorient	1929	1931	..	..	..	4 *5·5-in.*, 10 *1-pr.*, 12 M., 1000 mines.	—	30·0	oil	..

Old Armoured Cruiser (employed as training ship):—**Gueydon (1903), 8,200 tons, 19,600 H.P. (recip.), 18 knots, nine 5·5-in., four 3-in. A.A. guns.**

River Gunboats.—**Francis Garnier (1929), 639 tons, 15 knots, two 4-in., one 3-in. A.A.; Vigilante, Argus (1924), 177 tons 12 knots, two 3-in; Balny (1921), 196 tons, 14 knots, one 3-in.; La Grandière (1921), 39 tons, 11 knots; Doudart de Lagrée (1909), 265 tons, 14 knots; Mytho, Tourane (building at Sargon), 100 tons, 250 H.P. (Diesel), 10 knots, one 3 in.** Gunboat.—**Jouffroy d'Abbans, 400 tons, 15 knots, 2-3 in., building.**

Minesweepers.—**Conquérante (1918), 374 tons, 17 knots, two 3·9-in.; Luronne (1917), 265 tons, 13·8 knots, two 3·9-in.; Impétueuse, Batailleuse, Audacieuse (1917), 265 tons, 15 knots, two 3·9-in.; Engageante, Diligente (1917), 360 tons, 17 knots, two 3·9-in.; Agile, Inconstant, Ardent (1916), 310 tons, 17 knots, two 3·9-in.; Sans-Souci, Étourdi, Alerte, (1916), 310 tons, 17 knots, two 3·9-in.; Gracieuse, Capricieuse, Dédaigneuse, Tapageuse, Surveillante (1916), 315 tons, 15 knots, two 3·9-in.; Granit, Mica, Meulière, Quartz (1918), 354 tons, 12·5 knots, one 9-pr.**

Minelayers.—**Castor, 3,150 tons, 14 knots, three 3·9-in., two 1·5 A.A.; Pollux, 2,460 tons, 14 knots, three 3·9-in. Both converted 1930.**

Submarine Parent Ship.—**Jules Verne (1931), 5,747 tons, 7,000 H.P. (Diesel), 16 knots, mounting four 3·5-in. A.A., four 1-pdr. A.A.**

Sloops.—**Bougainville, Dumont D'Urville, Savorgnan de Brazza, and d'Entrecasteaux (1932–1933). Rigault-de-Genouilly Amiral Charner, and D'Iberville (building), 1970 tons, 3,000 H.P. (Diesel), 15·5 knots, armament three 5·5-in., four 1-pr. A.A., 6 M., 50 mines, 1 seaplane. Ville d'Ys (1917) (on fishery protection duties), 1122 tons, 17 knots, mounting three 3·9-in., three 3-in., 2 M.; Régulus (1917), Antares, Aldébaran, Bellatrix, Algol, Altair (1916), 1122 tons, 17 knots, mounting two 5·5-in., two 3-in. A.A., 2 M.**

Despatch Vessels.—**Du Couedic, Enseigne Henry, Duperré, Duchaffault, Dubourdieu, 1919–1920, 453 tons, 17 knots, one 5·5-in., one 3·9-in.; Mondemont, Montmirail, Remiremont, Baccarat, Bethune, Vitry-le-Francois, Lievin, Calais, Lassigny, Les Eparges, Vauquois, Vimy, Craonne, Ypres (*ex*-Dunkerque), Epinal, Nancy, Coucy, Laffaux, Amiens, Toul, Tahure, Arras, Bapaume, Reims, Peronne, Luneville (1919–1923), 644 tons, 20 knots, two 5·5-in., one 3-in. A.A.; Escaut, Ailette, Ancre, Scarpe, Suippe, Meuse, Yser, Somme, Oise, Aisne, Marne (1917–1919), 570–694 tons, 21 knots, four 3·9-in. Quentin-Roosevelt (on fishery protection duties), 586 tons, 13 knots, one 3-in gun.**

Net-Layers.—**Le Gladiateur, is being built at Lorient, 2,300 tons, 387 feet long, 7,700 H.P., 20 knots, four 3·5 in. A.A., 6 M. A second is projected.**

Escorteurs (Convoy Sloops).—**Bayonnaise, Cordelière, Poursuivante, Incomprise, Malpomene, Flore, Pomone, Iphigenie, Branle-Bas, Bombarde, Boucher and Batiste (building), 600 tons, four 3·5 guns.**

Surveying Ships.—**Amiral Mouchez (building), 800 tons, 12 knots. La Péronne and Beautemps-Beaupré (1920), 1000 tons, one 3-in. A.A. Astrolabe, Octant, and Gaston-Rivier (1918), 460 tons, 10 knots; Soudé (1911), 50 tons, 10 knots; Chimère (1901), 330 tons, 14 knots; Utile (1894), 450 tons, 13 knots.**

C.M.Bs.—**V.T.B. 1 (1922) (55 feet), 10 tons, 37 knots; V.T.A. 1 (1921) (50 ft.), 5 tons, 37·6 knots. Ten building.**

Submarine Chasers.—**Nos. 1-4 (building), 148 tons, 2,400 H.P., 20 knots, one 3-in gun. Twenty-seven in number (1918), 70 tons, 16 knots, one 3-in gun.**

GERMANY.—Battleships.

Class.	NAME.	Normal Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
*b.**	Deutschland †						Deutsche Werke, Kiel	1931	1933	estimated 3,750,000											
*b.**	Admiral Scheer ‡	10,000 (standard)	590 (on W.L.)	67 6	19 0	54,000–56,800 Diesel ‖	Wilhelmshaven	1933	Bldg. est. 1934	estimated 3,530,000	about 4	—	—	—	about 7	—	6 *11-in.*, 8 *5·9-in.*, 4 *3·4-in.* A.A., 8 *1-pr.*	6 19·7″ (T.)	26	— / 1200	634
*b.**	Ersatz Braunschweig						Wilhelmshaven	—	Bldg.	estimated 3,530,000					—						
b.	Hannover §	13,040	413 1	72 10	25 3	17,000 T.S. recip.	Wilhelmshaven	1905	1907	1,157,500	9½–4 K.S.	8	8 K.S.	6 K.S.	10–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 4 *3·5-in.* A.A., 23 M.	4 a.w. 19·7″	18	1771 / 197	727
b.	Hessen	12,988	413 5	72 10	25 3	16,000 T.S. recip.	Kiel (Germania)	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 12 *6·7-in.*, 4 *3·5-in.* A.A., 23 M.	4 a w. 19·7″	18	1574 / 197	727
b.	Schlesien §						Schichau														
b.	Schleswig-Holstein §	13,040	413 1	72 10	25 3	17,000 T.S. recip.	Germania	1906	1908	1,214,000	9½–4 K S.	3	8 K.S.	6 K.S.	11–6 K.S.	6¾ K.S.	4 *11-in.*, 12 *5·9-in.*, 4 *3·5-in.* A.A., 23 M.	4 a.w. 19.7″	18	1771 / 197	727

* Officially rated as "Armoured Ships."
† Formerly known as Ersatz Preussen.
‡ Formerly known as Ersatz Lothringen.
§ Reconstructed 1925–30.
‖ Consists of eight double-acting two-stroke M.A.N. Diesels.
A fourth armoured ship, Ersatz Elsass, is to be laid down in 1934.

GERMANY.—Cruisers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal./Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
l.c.	**Leipzig**	6000	548 10 (on W.L.)	53 5	15 7	72,000† [geared turbines 60,000, Diesels 12,000]	Wilhelmshaven	..	1929	1931	2,050,000	3–4	..	9 *5·9-in.*, 4 *3·4-in.* A.A.	4 triple *19·7-in.* a.w.	32	— / 1500 (including Diesel oil)	534
l.c.	**Köln**						Wilhelmshaven	..	1928	1930	1,785,000							
l.c.	**Karlsruhe**	6000	570 10	49 10	17 8	65,000‡	Deutsche Werke, Kiel	..	1927	1929	1,985,000	3–4	..	9 *5·9-in.*, 4 *3·4-in.* A.A.	4 triple *19·7-in.* a.w.	32	— / 1200	500
l.c.	**Königsberg**						Wilhelmshaven	..	1927	1929	2,100,000							
l.c.	**Emden**	6000	510 2	46 11	17 4	46,500 (G.)	Wilhelmshaven	..	1925	1925	..	3	..	8 *5·9-in.*, 2 *3·4-in.* A.A.	2 twin *19·7-in.* a.w.	29	1100 / 700	483
l.c.	**Berlin**	3592 (normal)	362 7	43 4	16 5	10,000 recip.	Danzig	..	1903	1905	..	..	..	8 *4·1-in.*	2 *19·7-in.* a.w.	22	846 / —	349

Gunnery Training Ships.—Drache (1908), 778 tons, 16 knots, 4 4.1-in.; Fuchs (1919), 517 tons, 16 knots, 2 4·1-in.; Delfin, 517 tons, 16 knots. Gunnery Tender Bremse (formerly known as Ersatz Drache) (Wilhelmshaven, 1932), 1,230 tons, 339½ feet long, 31 ft. 2 in. beam, 25,000 H.P. (Diesel), 27 knots, 4 4·1-in. guns, complement 112. A second new Gunnery Tender, Ersatz Hay, is authorised (to be laid down in 1936).

Fishery Protection Vessels.—Weser and Elbe (Wilhelmshaven, 1931), 590 tons, 1600 H.P. (Diesel), 15 knots; Zieten (1919), 541 tons, 17 knots.

Experimental Vessels.—Pelican and Nautilus (500 tons, 17 knots), Grille (470 tons, 10 knots).

Minesweepers.—29 in number (reciprocating machinery). 475–525 tons, 16 knots. Six are projected to commence in 1935.

Sailing Training Ship.—Gorch Fock (Hamburg, 1933) (replacing the Niobe). Three-masted barque, 239 feet in length, 1,500 tons, 500 H.P. auxiliary motor giving 8 knots.

Barrage Craft.—R 1—7 (1933), 85 ft., 44 tons, 700 H.P., 17½ knots.

Patrol or Guard Boats.—S 1—6 (1932), 92 ft., 46 tons, 2,400 H.P., 31½ knots. UZ 27—33, 102 ft., 60 tons, 500 H.P., 14 knots. UZ 15, 17, 18, 21, 10 tons, 25 knots.

Target Ship.—Zähringen (ex-battleship), 11,800 tons. Wireless controlled. Target Tugs and Control Ships.—Pfeil and Blitz, 650 tons.

Fleet Tenders.—Hela, Nordsee. Station Tenders.—Nixe, Frauenlob.

Surveying Vessels.—Meteor (1924), 1150 tons, and two surveying launches, 90 tons.

† Three propeller shafts, of which the centre shaft is Diesel-driven and the outers turbine-driven. Diesels used for cruising or combined with the turbines to give full speed.

‡ Parsons geared turbines with Diesels for cruising.

GREECE.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Giorgios Averoff *	9301	462	69	24¾	19,000 (21,500 *t*) B.	Leghorn (Orlando)	1910	1911	1,100,000	8–3½ K.S.	1¾	7	7	8–6½	7	4 *9·2-in.*, 8 *7·5-in.*, 16 *3-in.*, 4 *3-pr.*, 2 *3-in.* A.A., 2 M.	3 (sub.) *18-in.*	22½ (24 *t.*)	1500 / —	..
cr.	Helle † (*ex* Fei-Hung)	2083	322	39	14	6000 P.T. (G.)	Camden, N.J.	1912	1914	240,000	..	1¼	..	..	..	..	3 *6-in.*, 1 *3-in.* A.A., 110 mines	2 a.w. *18-in.*	20	600 / 100	230

* Retubed and refitted 1927. † Repaired and converted to oil burning in France and fitted as a minelayer in 1929.

Old gunboat (gunnery school tender), Amvrakia, 470 tons. Training ship, Ares, 1,870 tons, 10 knots, four 3-in. guns, completed at Chantiers de la Méditerranée, la Seyne, 1929. Repair ship, Hephestos (1920), 4,549 tons gross, 11½ knots. Surveying ship (old sloop), Nautilus, 400 tons, 11 knots, two 3-in guns. Dispatch vessels, Korghia Lenios (1916), 380 tons, 13½ knots, and Kichli (1884), 86 tons, 10 knots. C.M.B's., two Thornycroft type, 55 ft.

ITALY.—Battleships.

Class.	NAME. Date for Scrapping and Replacement under Washington Treaty (1922.).*	Standard Displacement.	Length. (Extreme.)		Beam.		Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement
		tons.	ft.	ins.	ft.	ins.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Andrea Doria 1937	21,555	575	9	92	0	29	24,000 P.T. Y.	Spezia	1913	1916	..	10–4 K.S.	1¾	6 K.S.	..	9½ K.S.	6 K.S.	13 *12-in.*, 16 *6-in.*, 13 † *3-in.*, 6 *3-in.* A.A., 2 *2-pr.*, 6 M., 4 L., 1 catapult, 1 aircraft	2 (sub.) *18-in.*	22	1430 / 840	1074
b.	Caio Duilio 1936								Castellammare	1913	1915												
b.	Conte di Cavour 1936	21,603	575	9	92	0	29	24,000 P.T. Bl.	Spezia	1911	1915	..	10–4½ K.S.	1¾	6 K.S.	..	9½ K.S.	5 K.S.	13 *12-in.*, 18 *4·7-in.*, 13 † *3-in.*, 6 *3-in.* A.A., 2 *2-pr.*, 2 M., 4 L., 1 catapult, 1 aircraft	2 (sub.) *18-in.*	22	1430 / 840	1074
b.	Giulio Cesare 1935	21,816	575	9	92	0	29	24,000 P.T. B. & W.	Genoa (Ansaldo)	1911	1914	..	10–4½ K.S.	1¾	6 K.S.	..	9½ K.S.	5	13 *12-in.*, 18 *4·7-in.*, 13 † *3-in.*, 6 *3-in.* A.A., 2 *2-pr.*, 2 M., 4 L., 1 catapult, 1 aircraft	2 (sub.) *18-in.*	22	1430 / 690	1074
§	Pisa †	8759	460	11	68	11	24¾	19,000 recip. Belleville	Leghorn (Orlando)	1907	1909	..	8–3 K.S.	1¾	7 K.S.	7 K.S.	8–6 K.S.	6½	4 *10-in.*, 8 *7·5-in.*, 12 *3-in.*, 6 *3-in.* A.A., 2 *3-pr.*, 4 M., 2 L.	2 (sub.) *18-in.*	22·5	1486 / 138	687
§	San Giorgio	9232	462	2	69	0	24¾	18000 recip. Bl.	Castellammare	1908	1910	..	8–3 K.S.	1¾	7 K.S.	7 K.S.	7–6 K.S.	7 K.S.	4 *10-in.*, 8 *7·5-in.*, 10 *3-in.*, 6 *3-in.* A.A., 2 *3-pr.*, 6 M., 2 L.	2 (sub.) *18-in.*	22·5	1476 / 115	643
§	San Marco	9350						20000 P.T. B.			1911										23	1378 / 66	

* The London Naval Treaty (1930) suspended the replacement of capital ships during the years 1931–36 inclusive.

† Cadets training ship.

‡ Three of these are temporarily removed.

§ Armoured Cruisers, classified as Battleships, 2nd class, in Italian Official Lists.

ITALY.—Cruisers, &c.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Side. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft.					£	in.	in.			knots.	tons.	
—	Duca degli Abruzzi Guiseppe Garibaldi	7000	..	..	..	.	Cantieri Riuniti dell' Adriatico, Trieste Odero-Terni, Orlando Spezia	..	Bldg.	..	..	.	6-in. guns	..	..	..	..
—	Eugenio di Savoia Filiberto Duca d'Aosta	6791	..	..	..	..	Ansaldo, Genoa Orlando, Leghorn	1933	Bldg.	..	..	..	8 6-in.	..	..	..	..
Zara Class	Pola	10,000	600 0	67 8	20·2	95,000 (G.)	Orlando, Leghorn	1931	1933	..	Abt. 6	..	8 8-in., 16 3·9-in. A.A., 12 smlr., 1 catapult, 2 aircraft	—	32	oil	840
Condottieri Class	Montecuccoli Muzio Attendolo	5857	..	..	..	95,000	Ansaldo, Genoa Trieste	1933	Bldg. est. 1934	..	..	..	8 6-in., 6 3·9-in. A.A., 8 smaller	4 21″	37	oil	..
Zara Class	Gorizia	10,000	590 9	67 9	20·2	95,000 (G.)	Orlando, Leghorn	1930	1932	..	Abt. 6	..	8 8-in., 16 3·9-in. A.A., 12 smlr., 1 catapult, 2 aircraft	—	32	oil	840
Modified Trento Class	Bolzano	10,000	644 0 b.p.	68 0	..	150,000	Ansaldo, Genoa	1932	1933	..	..	..	8 8-in., 16 3·9-in. A.A., 12 smaller, 2 catapults	8 ‡ 21″	36	oil	..
Condottieri Class	Armando Diaz Luigi Cadorna	5008	559 0	51 0	14·5	95,000 (G.)	Odero-Terni, Spezia Stabilimento Tecnico Triestino, Trieste	1932 1931	1933	..	..	..	8 6-in., 6 3·9-in. A.A., 8 M. 1 catapult, 2 seaplanes	4 21″ (D.)	37	oil	..
Zara Class	Zara Fiume	10,000	599 5	67 8	20·2	95,000 (G.)	Odero-Terni, Muggiano Stabilimento Tecnico Triestino, Trieste	1930	1931	..	4 / —	..	8 8-in., 16 3·9-in. A.A., 12 smaller (Zara 8), 1 catapult, 2 aircraft	—	32	2200	..
Condottieri Class	Alberto da Giussano Alberico di Barbiano Bartolomeo Colleoni Giov. della Bande Nere	5069	555 0	51 0	14·5	95,000 (G.)	Ansaldo, Sestri-Ponente Castellamare	1930	1931 1931 1932 1932	..	..	..	8 6-in., 6 3·9-in. A.A., 6 M., 1 catapult, 2 seaplanes	4 21″ (D.)	37	oil	..

Trento Class	Trieste . . / Trento . .	10,000	640	9	67	7	18¾	150,000 (G.)	Orlando, Leghorn / Stablemento Tecnico, Trieste	1926 / 1927	1929	..	2¾ / 2	..	8 8-*in.*, 16 3·9-*in.* A.A., 6 smaller, 1 catapult, 2 seaplanes.	8 a.w. (D.)	35	— / 3000	800
l. c. .	**Ancona** . . (*ex* German Graudenz)	3838	456	0	45	0	17	26,000 tur.	Kiel . .	1913	1915	..	4–2¼ / 1	..	7 5·9-*in.*, 3 3-*in.* A.A., 3 M., 120 mines, 1 catapult	2 19·7″	27·5	1279 / 400	364
„ .	**Bari** (*ex*-German Pillau)	3248	440	11	46	0	19	27,400 tur.	Danzig (Schichau) .	1914	1915	..	— / 1½–¾	1	8 5·9-*in.*, 3 3-*in.* A.A., 3 M., 120 mines	2 19·7″	27·5	984 / 250	372
„† .	**Brindisi** (*ex*-Austrian Helgoland)	2756	430	0	42	0	15	25,600 tur.	Fiume . . .	1912	1914	..	2½ / ¾	..	9 3·9-*in.*, 1 3-*in.* A.A., 3 M., 1 L., 170 mines	4	27·0	750 / —	320
„ .	**Libia** . . .	3700	367	0	47	6	16	12,500 recip.	Genoa (Ansaldo) .	1912	1913	..	— / 1½	..	8 4·7-*in.*, 3 3-*in.* A.A., 3 M.	..	22·9	640 / —	300
l. cr. † .	**Quarto** . .	2903	431	9	42	2	13¼	25,000 P.T. Bl.	Venice . .	1911	1913	..	— / 1½–¾	..	6 4·7-*in.*, 6 3-*in.*, 2 2-*pr.* A.A., 3 M., 126 mines	2 a.w. 18″	28	49 / 482	240
l. cr. .	**Taranto** (*ex*-German Strassburg)	3184	446	2	43	7	15¾	26,000 P.T. T.S.	Wilhelmshaven .	1911	1914	416,340	4–2½ / —	2	7 5·9-*in.*, 2 3-*in.* A.A., 3 M., 120 mines	2 19·7″	27	1200 / —	373
l. cr.† .	**Venezia** (*ex*-Austrian Saida)	2756	430	0	42	0	15	25,600 tur.	Monfalcone .	1912	1914	..	2½ / ¼	..	9 3·9-*in.*, 1 3-*in.* A.A., 3 M.	4	27·0	750 / —	320
S.C. .	**Miraglia** * . .	4891	397	0	49	3	17	12,000 P.T.	Spezia . . .	1923	1927	..	..	..	4 4-*in.* A.A., 1 M., 2 catapults, 16 planes	—	21·5	— / 440	300

* *Ex*-merchant ship, taken over on the stocks. † Classified as Scouts in Italian Lists. ‡ May be fitted.

COMBINED MINELAYERS AND MINESWEEPERS.—**Fasana, Buccari, Durazzo,** and **Pelagosa,** completed 1926, 531 tons, 11 knots (I.C. machinery), 1 3-*in.* gun, 200 mines; **Azio, Legnano, Lepanto, Dardanelli, Milazzo,** and **Ostia,** completed 1926–7, 615 tons, 15 knots (recip.), 2 4-*in.*, 1 3-*in.*, 200 mines.

MINELAYERS.—**Marghera** and **Brondobo,** 117 tons, 13 knots, 1 3-*in.*, 60 mines; **Laurana, Rovigno,** and **Albona** (*ex*-Austrian), 112 tons, 11 knots, 1 3-*in.*

MINESWEEPERS.—Cotrone, Viesti, 475 tons, 13·8 knots, 2 4-*in.* guns; 38 in No., 200 tons, 14 knots, 1 3-*in.* gun.

OIL TRANSPORTS.—**Marte, Dalmazia, Istria, Livenza, Urano, Prometeo, Cocito, Lete, Stige, Niobe, Cerere, Giove, Tarvisio, Quarnero.** Oil transport with under-water protection, **Brennero,** 10,000 tons, 10½ knots.

GUNBOAT, **Arimondi** (1910), 432 tons, 9 knots, 2 3-*in.* A.A. guns. RIVER GUNBOATS.—**S. Caboto** (1912), 863 tons, 13 knots, 6 3-*in.* guns; **E. Carlotto** (1918), 180 tons, 14 knots, 2 3-*in.* A.A. guns. ESCORT GUNBOATS.—**A. Bafile, T. Farinati, E. Giovannini, C. del Greco,** and **A. Vitturi** (1922), 182 tons, 23 knots, 2 4-*in.* guns, 2 T.T.

SURVEYING VESSELS.—**Ammiraglio Magnaghi** (1914), 1800 tons, 14 knots; **Cariddi** (1916), 330 tons, 10 knots: **Scilla** (1916), 350 tons, 11 knots; **Tritone** (1913), 340 tons, 10 knots. 42 ARMED MOTOR BOATS (M.A.S.) built and 6 under construction.

PATROL VESSELS.—**Cherso** and **Lussin** (1912), 4000 tons, 10½ knots; **Lante** and **Bianco** (1917), 280 tons, 12 knots; **Lutti** and **Cirene** (1912), 340 tons, 10 knots; **Corsini** (1912), 290 tons, 12 knots; **Rimini** (1912), 319 tons, 9½ knots; **Gallipoli** (1911), 310 tons, 10½ knots; **Otranto** (1911), 290 tons, 10 knots; **Giannutri** (1912), 680 tons, 13 knots; **Alula** (1912), 308 tons, 13 knots.

TRAINING SHIPS.—**Cristoforo Colombo** (Castellamare, 1928), 3,000 tons, 10 knots (Diesel-electric); **Amerigo Vespucci** (Castellamare, 1931), 3,543 tons, 1,800 H.P. (Diesel-electric), 11 knots, 4 3-*in.* A.A. SUBMARINE DEPÔT SHIPS (Sloops).—**Volta** and **Pacinotti** (1924), 2,362 tons, 19 knots, 1 4-*in.*, 2 4-*in.* A.A.

OLD CRUISER.—**F. Ferrucio** (1905), 6,299 tons, 13,500 H.P. (recip.), 19·3 knots. CABLE SHIP.—**Citta di Milano** (5,500 tons), 10 knots.

JAPAN.—Battleships.

Type.	NAME. Date for Scrapping and Replacement under Washington Treaty (1922).*	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft. ins.						in.	in.	in	in.	in.	in.			knots.	tons.	
Fuso Class	Fuso . . 1937	29,330	673 0	94 0	28 6	40,000 B.C.T.	Kure . .	1914	1915	..	12·4 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L., 1 seaplane	6 (sub.) (D) *21-in.*	22·5	4000 / 1300	1272
	Hyuga . . 1940	29,990	683 0	94 0	28 8	45,000 tur.	Nagasaki . (Mitsubishi)	1917	1918								12 *14-in.*, 20 *5·5-in.*, 4 *3-in.* A.A., 2 M. H.A., 2 seaplanes, 1 catapult	6 (sub.) (D) *21-in.*	23	4500 / 1300	1360
	Ise . . 1939	29,990	683 0	94 0	28 8	45,000 B.C. tur.	Kobe . . (Kawasaki)	1916	1917	..	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 *14-in.*, 20 *5·5-in.*, 4 *3-in.* A.A., 2 M. H.A., 2 seaplanes	6 (sub.) (D) *21-in.*	23	4500 / 1300	1360
	Yamashiro † . 1938	29,330	673 0	94 0	28 6	40,000 B.C.T.	Yokosuka	1915	1917	..	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L., 1 seaplane	6 (sub.) *21-in.* (D)	22·5	4000 / 1300	1272
Kongo Class	Haruna ‡ . 1935	29,330	704 0	95 0	27 6	64,000 P.T.	Kobe . . (Kawasaki)	1913	1915	..	8–3 K.S.	$2\frac{3}{4}$	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L., 1 seaplane	4 (sub.) *21-in.*	26·0	oil	1250
	Kirishima ‡ . 1936	29,330	704 0	92 6	27 0	64,000 P.T.	Nagasaki . (Mitsubishi)	1913	1915	..	8–3 K.S.	$2\frac{3}{4}$	6	.	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L. 1 seaplane	4 (sub.) *21-in.*	26	oil	1250
	Kongo ‡ . 1934	29,330	704 0	92 0	27 6	64,000 P.T.	Barrow .	1912	1913	2,500,000	8–3 K.S.	$2\frac{3}{4}$	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *3-in.* A.A., 4 M., 4 L., 1 seaplane	4 (sub.) *21-in.*	26	oil	1309 (as flagship)
Nagato Class	Mutsu . 1942	32,720	700 0	95 0	31 0	46,000 (G.)	Yokosuka .	1920	1921	..	13–9 K.S.	$3\frac{1}{2}$	.	..	14		8 *16-in.*, 20 *5·5-in.*, 4 *3-in.* A.A., 3 M., seaplanes (Mutsu 2, Nagato 3)	4 (sub) 4 a.w *21-in.*	23	1600 / 3400	1304
	Nagato . 1941						Kure . .	1919	1920												1367 (as fleet flagship)

Armoured Cruisers now rated as Coast-defence Ships (1st class), completed 1899–1904: Nisshin, 7080 tons, 20 knots, 4 8-in., 14 6-in.; Kasuga, 7080 tons, 20 knots, 1 10-in., 2 8-in.; Yakumo, 9010 tons, 20 knots, 4 8-in., 12 6-in.; Adzuma, 8640 tons, 20 knots, 4 8-in., 12 6-in.; Idzumo and Iwate, 9180 tons, 16 knots, 4 8-in., 14 6-in.; Asama, 9240 tons, $21\frac{1}{2}$ knots, 4 8-in., 8 6-in.; Tsushima (2nd class), 3120 tons, 20 knots, 6 6-in., 8 3-in., 1 3-in. A.A.

* The London Naval Treaty (1930) suspended the replacement of capital ships during the years 1931–36 inclusive. † Being modernised.

‡ Modernised 1928–1931, including fitting of bulges and new foremast, and conversion to oil burning. Hiyei of this class has been de-militarised and converted to a training ship in accordance with London Naval Treaty.

JAPAN.—Aircraft Carriers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Side / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft. ins.					£	in.	in.			knots.	tons.	
A.C.	Akagi *	26,900	763 b.p.	92	21 2	131,200 (G.)	Kure	1925	1927	..	..	..	10 *8-in.*, 12 *4·7-in.* A.A., capacity for 50 aircraft. Carries about 30 aircraft	—	28·5	2100 / 3000	..
A.C.	Hosho †	7470	510 b.p.	62	20 3	30,000 (G.)	Tsurumi (Asano)	1921	1922	..	..	..	4 *5·5-in.*, 2 *3-in.* A.A., 20 aircraft	—	25	— / 2700	550
S.C.	Kamoi §	19,550	495	67	28 0	8,000 turbines and electric drive	New York S.B. Co.	1922	1922 (converted 1933)	..	..	..	2 *5·5-in.*	—	15	..	..
A.C.	Kaga ‡	26,900	715 b.p.	102	22 1	91,000	Kobe (Kawasaki)	1921	1928	..	..	..	10 *8-in.*, 12 *4·7-in.* A.A., capacity for 60 aircraft. Carries about 30 aircraft	—	25	— / 5300	..
S.C.	Notoro §	14,050	445 b.p.	58	26 6	5,850 recip.	Kobe (Kawasaki)	1920	1920	.	..	..	2 *4·7-in.*, 2 *3-in.* A.A., 16 seaplanes	—	12	— / 1000	..
A.C.	Ryujo	7600	548 (on W.L.)	60 8	15 0	40,000 (G.)	Yokohama	1931	1933	..	..	..	12 *5·1-in.*, A.A., 24 aircraft	—	25	oil	600

* Designed as a battle cruiser. † Fitted with gyro-stabiliser. ‡ Designed as a battleship. § Converted from oilers.

JAPAN.—Cruisers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost	Armour. Side. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
—	Mogami Mikuma	8500	625	59½	14·8	90,000	Kure Nagasaki	..	Bldg.	2,500,000 estimated	..	..	15 *6·1-in.*	..	33	..	..
Takao Class	Chokai Maya Atago Takao	9850	630 b.p.	62½	16¼	100,000 (G.)	Nagasaki Kobe Kure Yokosuka	1931 1930 1930	1932 1932	..	3 / —	..	10 *8-in.*, 4 *4·7-in.* A.A., 2 M. 2 catapults	8 21-in. a.w. (D.)	33	oil	692
Nachi Class	Ashigara Haguro Myoko Nachi	10,000	630 p.p.	62½	16½	100,000 (G.)	Kobe Nagasaki Yokosuka Kure	1928 1927	1929 1929 1929 1928	..	3 / —	..	10 *8-in.*, 6 *4·7-in.* A.A., 2 M., 1 catapult, 2 aircraft	12 21-in. a.w. (T.)	33	— / 2500	692
Furutaka Class	Kinugasa Aoba Furutaka Kako	7100	595	51	15¼	95,000 (G.)	Kawasaki, Kobe Nagasaki " Kawasaki, Kobe	1926 1926 1925 1925	1927 1927 1926 1926	.. ..	.. ..	.. ..	6 *8-in.*, 4 *4·7-in.* A.A., 2 M., 1—2 planes, 1 catapult 6 *8-in.*, 4 *3-in.* A.A., 2 M., 2 planes, 1 catapult	12 21-in. a.w.	33	400 / 1400	604
Chikuma Class	Hirado Yahagi	4400	475	46½	16¾	22,500 P.T.	Kobe Nagasaki	1911	1912	..	2¼ / —	..	8 *6-in.*, 2 *3-in.*, 2 *3-in.* A.A., 2 M.	3 18-in. a.w.	26	900 / 300	410
Natori Class	Abukuma Isudzu Nagara Natori	5170	535	46¾	15¾	90,000 (G.)	Uraga Uraga Sasebo Nagasaki (Mitsubishi)	1923 1921 1922 1922	1925 1923 1922 1922	..	2 / —	..	7 *5·5-in.*, 2 *3-in.* A.A., 2 M., 1 seaplane, 1 catapult	8 21-in. a.w. (D.)	33·0	300 / 1260	450

Natori Class	Yura	5170	535	$47\frac{1}{4}$	$15\frac{3}{4}$	90,000 (G.)	Sasebo	1922	1923	..	2/—	..	7 *5·5-in.* 2 *3-in.* A.A., 2 M., 1 seaplane, 1 catapult	8 21-in. a.w (D.)	33·0	300/1260	450
	Kinu						Kawasaki	1922	1922								
Sendai Class	Jintsu	5195	535	$46\frac{3}{4}$	$15\frac{3}{4}$	90,000 (G.)	Kawasaki	1923	1925	..	2/—	..	7 *5·5-in.*, 2 *3-in.* A.A., 2 M., 1 seaplane, 1 catapult	8 21-in.	33·0	300/1260	450
	Naka						Yokohama	1925	1925								
	Sendai						Nagasaki	1923	1924								
Kuma Class	Kiso	5100	535	$47\frac{1}{4}$	$15\frac{3}{4}$	90,000 (G.)	Nagasaki	1920	1921	..	2/—	..	7 *5·5-in.*, 2 *3-in.* A.A., 2 M., 1 seaplane, 80 mines	8 21-in. a.w. (D.)	33·0	300/1260	439
	Kitakami						Sasebo	1920	1921								
	Kuma						Sasebo	1919	1920								
	Oi						Kobe	1920	1921								
	Tama						Nagasaki (Mitsubishi)	1920	1921								
Tenryu Class	Tatsuta	3230	468	$40\frac{3}{4}$	13	51,000 (G.)	Sasebo	1918	1919	..	..	..	4 *5·5-in.*, 1 *3-in.* A.A., 2 M. Fitted for minelaying.	6 (T.)	31	—/900	332
	Tenryu						Yokosuka										
—	Yubari	2890	435 b.p.	$39\frac{1}{2}$	$11\frac{3}{4}$	57,000 (G.)	Sasebo	1923	1923	..	..	..	6 *5·5-in.*, 1 *3-in.* A.A., 2 M. 34 mines	4 21-in. a.w. (D.)	33	—/820	328

Two cruisers, No. 3 and No. 4, of 8500 tons are authorised. A replenishment programme of new construction is projected to cover a period of 3 or 4 years and comprising 2 cruisers (8500 tons), 2 aircraft carriers (10 000 tons), 14 destroyers (1400 tons), 6 submarines (of a total tonnage of 7500 tons), a minelayer (5000 tons), 8 torpedo boats.

MINELAYERS.—Matsushima (440 tons), building at Ishikawajima; Sarushima, building at Yokohama; Nashimi, building at Harima; Katsuriki (1917), 1540 tons, 13 knots, 3 3-in., 150 mines; Itsukushima (Uraga, 1929), 1970 tons, 16 knots, 3000 H.P. (Diesel), 3 5·5-in., 2 3-in. A.A.; Tokiwa, 9240 tons, 21 knots, 2 8-in., 8 6-in., 3 3-in., and 17 smaller vessels, 300—400 tons, about 12 knots. A minelayer of 5000 tons is projected.

MINESWEEPERS.—Nos. 1, 2, 3 (1923), No. 4 (1925), and Nos. 5, 6 (1929), 615 tons, 20 knots, 2 4·7-in., 1 3-in. A.A. Nos. 9, 10 (1918), 770 tons, 24 knots, 2 4·7-in.; Nos. 13—16 (Building), 492 tons, 1 4·7-in. gun, and Nos. 17 and 18 are projected.

GUNBOATS.—Saga (1912), 685 tons, 15 knots, 3 3-in.; Uji (1903), 540 tons, 13 knots, 4 3-in.; Ataka (1922), 725 tons, 16 knots, 2 4·7-in., 2 3-in. A.A.

RIVER GUNBOATS.—Futami (1930), Atami (1929), 170 tons, 16 knots, 1 3-in. gun Katata, Hira, Hodzu, Seta (1923), 305 tons, 16 knots, 2 3-in. A.A.; Toba (1911), 215 tons, 15 knots, 2 3-in.; Fushimi (1906), 150 tons, 14 knots, 2 6-pr.; Sumida (1906), 105 tons, 13 knots, 2 6-pr.; and Kotaka (1930), 50 tons, 15 knots, 5 M.G.

SUBMARINE DEPÔT SHIPS.—Taigei (building at Yokohama), 10,000 tons, 689 feet, 13,000 H.P., 20 knots, 4 5-in. A.A.; Chogei (1924), Jingei (1923), 5160 tons, 16 knots, 4 5·5-in.; Komahashi (1914), 1230 tons, 13·9 knots, 2 3-in, 1 3-in. A.A.; Karasaki (1896), 9750 tons, 13 knots, 1 3-in., 1 3-in. A.A.

ANTI-SUBMARINE NETLAYERS.—Yayeyama (1932), 1135 tons, 4800 H.P. (reciprocating machinery), 20 knots, 2 4·7-in. A.A.; Shirataka (1929), 1324 tons, 16 knots, three 4·7-in. A.A. guns. Tsubane and Kamone (1929), 450 tons, 19 knots, 1 3-in.

SUBMARINE CHASERS.—Two building at Ishikawajima. Reported to be 300 tons, 24 knots.

REPAIR SHIP AND SUBMARINE SALVAGE SHIP.—Asahi (ex-Battleship, 12,000 tons). Salvage Ships. Cable Ships. Transports and other auxiliaries.

NETHERLANDS.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots	tons.	
cr.	Celebes	5900	560	51	16	70,000 P.T. Y.	Rotterdam (Wilton-Fijenoord)	..	Bldg. est 1935	..	3	..	..	..	..	..	6 *5·9-in.*, 4 *4·2-in.* A.A., 4 M.	—	32	..	450
cr.	Java *	6670	509½	52½	18	65,000	Flushing	1921	1925	..	3	..	1	..	4	..	10 *5·9-in.*, 4 *3-in.* A.A., 8 M., 40 mines, 2 seaplanes	—	30	— / 1070	490
,,	Sumatra *						Amsterdam	1920	1926												
a.g.b.	Brinio	540	172¼	28	9¼	1200 Diesel	Amsterdam	1912	1914	..	2 K.S.	¾	..	..	..	..	4 *4·1-in.*, 2 M.	—	14	34 / —	52
,,	Friso							1912	1914												
,,	Gruno							1913	1915												
c.d.s.	Hertog Hendrik	4371	317	50	19	6282 *t.* Y.	Amsterdam	1902	1903	347,500	6 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 6 *5·9-in.*, 4 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	1 a.w. 2 sub. 18″	16·5 *t*	710 / —	347
,,	Jacob van Heemskerck †	4445	321½	50	19	6396 *t.* Y.	Amsterdam	1906	1908	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	6 H.N.S.	2 *9·4-in.*, 6 *5·9-in.*, 6 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M., 2 seaplanes	—	16·5 *t*	520 / —	351
c.d.s.	Marten Tromp †	4562	330	50	18¾	6405 *t.*	Amsterdam	1904	1906	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 8 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	—	16·7 *t*	710 / —	349
,,	De Zeven Provincien † * (employed as training ship)	5644	333	56	20¼	8516 *t.* Y.	Amsterdam	1909	1910	..	6–4 K.S	2	..	..	10 K.S.	4 K.S.	2 *11-in.*, 4 *5·9-in.*, 10 *3-in.*, 1 *9-pr.*, 4 *1-pr.*, 2 M.	—	16·3 *t*	885 / —	409

Ships marked * above are in the East Indies Squadron. † Of little fighting value.

GUNBOATS.—(Indian Military Marine): Soemba, Flores (1926-7), and Johann Maurits van Nassau (1933), 1457 tons, 15 knots, three 5·9 in., one 3-in. A.A., 2 M.

MINELAYERS.—Nautilus (1930), used for fishery protection, 955 tons, 14 knots, one 3-in., two 1-pr., 2 M.; Douwe Aukes & Van Meerlant (1922), 749 tons, 13·5 knots, three 3-in. A.A., 2 M., 130 mines; Medusa and Hydra (1911), 670 tons, 11·5 knots, three 3-in., one 1-pr., 1 M., 65 mines; a new vessel authorised and eight old vessels. Minelayers attached to Indian Military Marine: Krakatau‡ (1924), 1120 tons, 17 knots, two 3-in A.A., 2 M., 150 mines; Pro Patria (1923), 605 tons, 11 knots, one 3-in. A.A., 2 M., 80 mines, Prins Van Oranje and Gouden Leeuw (1932), 1206 tons, 15 knots, two 3-in.; Rigel (1931), 1400 tons, 12½ knots; Hercules (1910), 188 tons, 10½ knots, and three old vessels.

MINESWEEPERS.—I.-IV., 270-295 tons; (for the Indian Military Marine): A, B, C, D (1930), 187 tons; and one 1600 tons building.

SURVEYING VESSELS.—Eilerts de Haan, Hydrograaf, and in the Indian Military Marine, Van Doorn, Van Gogh, Tydeman, and Willebrord Snellius.

SUBMARINE DEPÔT SHIPS.—Cornelius Drebbel (1915), 787 tons, 170 H.P. (Diesel), 6 knots; and (in Indian Military Marine) Pelikaan (1922), 2600 tons, 1400 H.P., 12 knots, four 2·75 in., 4 M. 4 C.M.B.'s. (Thornycroft 1928).

OLD LIGHT CRUISER Gelderland (1900), 3966 tons, now used as gunnery training ship. OLD GUNBOATS (1877-9): Hefring, 265 tons, Braga, Tyr and Freyr, 275 tons, 7-8 knots.

‡ Capsized in 1932; may be salvaged.

NORWAY.

Class.	NAME.	Normal Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			in.	in.			knots.	tons.	
c.d.s.	Eidsvold . / Norge .	4166	310¼	50½	16½	4500 Y.	Elswick	1900	1901	350,000	6 H.N.S.	2	..	..	6 H.N.S.	6 H.N.S.	2 *8·2-in.* 6 *5·9-in.*, 8 *3-in.*, 6 *3-pr.*	2 (sub.) 18-in	16·5	550 / —	270
„	Harald Haarfagre .	3860	304	48½	16½	4500	Elswick	1896	1898	300,000	7 H.S.	2	..	..	8 H.S.	..	2 *8·2-in.*, 6 *4·7-in.*, 6 *3-in.*, 2 *3-in.* A.A., 6 M.	3 18-in. 2 (sub.) 18-in.	16·5	550 / —	249
„	Tordenskjold*							1897	1899												

Fishery Protection Vessels: Fridtjof Nansen (1931), 1050 tons, 15 knots, 2000 H.P., two 4-in., two 2-pr; Heimdal (1892), 660 tons, 12 knots; four 12-pr.; and Michael Sars. Minelayers: Fröya (1918), 760 tons, 22 knots, 4 4-in., 100 mines; Glommen and Laugen (1918), 335 tons, 9½ knots, 150 mines; old gunboats, refitted as minelayers, Tyr, Gor, Vidar, Brage, Nor, Vale, and Uller, 230-280 tons, armed with one 4·7-in. and other guns. Olar Trygrason, minelayer and training ship, building at Horten, 1600 tons, 20 knots, 6000 H.P., 4 4·7-in. and 1 3-in. A.A. guns, and 2 T.T.s., 280 mines. Submarine Depôt Ship, Sarpen, 187 tons, 9 knots, two 9-pr. and one 1-pr.

Four sloops (1400 tons) and six minelayers, 500 tons, are projected, but no money has yet been voted.

* Employed as training ship for Cadets.

SOVIET UNION.—Battleships.

Class.	NAME.	Normal Displacement.	Length. (Extreme).	Beam.	Draught.	Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.							in.	in.	in.	in.	in.	in.			knots.	tons.	
b. b. b. b.	**Paris Commune** (*ex*-Sevastopol) **October Revolution** (*ex*-Gangut) **Marat** (*ex*-Petropavlovsk) **Krasni Leningrad** (*ex*-Michael Frunze, *ex*-Poltava)	23,000	594	87	27½	42,000	Baltic Works	Baltic Works	1911	1915	..	9–5	3	..	..	12–10	6	12 *12-in.*, 16 *4·7 in.*, 4 *3-in.* A.A., *and smaller*	4 (sub.) 18-in.	23	2000 / 1000	1130
b.	**General Alexieff*** (*ex*-Volya)	22,600	551¼	89¾	27	26,500	Nikolaev R.S.B.Co.	..	1914	1917	..	12–4	3–1½	9–8	..	12–8	5	12 *12-in.*, 18 *5-in.*, 4 *2·5-in.* A.A., 4 *3-pr.*, 8 *11-pr.*, 4 M.	4 (sub.) 18-in.	21	2300 / 720	1252

* Under French protection at Bizerta.

SOVIET UNION.—Cruisers.

Class.	NAME.	Normal Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt./Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal/Oil	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Admiral Istomin, Admiral Kornilov	7600	..	..	..	..	..	..	Bldg.	..	..	..	.. ..	..	..	..	..
,, l. cr.	Aurora (*ex*-S.S.S.R)	6730	416	55	21	11,600	Petrograd	1900	1903	..	..	..	14 *6-in.*, 5 *6-pr.* A.A., 2 M.	..	20	964/—	573
,,	Almaz *	3300	363	43½	17½	7,500	..	1903	1904	..	—/3	..	7 *4·7-in.*, 2 M.	..	19	650/—	300
,,	Chevonaya-Ukrainia (*ex*-Ad. Nakhimov)	7600	507	50⅓	18½	50,000	Nikolaev	1915	1925	..	..	..	15 *5·1-in.*, 4 *3-in.*, 4 *3-in.* A.A., 4 M., 100 mines, 2 seaplanes	(a.w.)	29½	540/690	600
,,	Komintern † (*ex*-Pamyat Merkuriya)	6675	440	54½	20½	19,500	Nikolaev	1903	1907	..	..	..	15 *5·1-in.*, 4 *3-in.*, 4 *6-pr.*	2 (sub.)	23	1190/—	595
,,	General Kornilov * (*ex*-Kagal)	6675	439½	54½	20½	19,500	Sevastopol	1902	1905	..	..	..	16 *6-in.*, 2 *11-pr.*	2 (sub.)	23	1100/—	595
,,	Krasni Kavkaz (*ex*-Ad. Lazarev)	7600	507	50⅓	18½	50,000	Nikolaev	1916	1930	..	3/1	3	15 *5·1-in.*, 4 *3-in.* A.A., 4 *4-in.* A.A., 4 M., 100 mines	(a.w.)	29½	540/690	650
,,	Profintern (*ex*-Svietlana)	7600	507	50⅓	18½	50,000	Reval	1915	1925	..	3/1	3	15 *5·1-in.*, 4 *4-in.* A.A., 4 *3-in.*, 4 M.	(a.w.)	29½	540/690	..
,,	Voroshilov (*ex*-Ad. Grieg)	7600	507	50⅓	18½	50,000	..	..	1930	..	..	..	15 *5·1-in.*, 4 *4-in.* A.A., 4 *3-in.*, 4 M.	(a.w.)	29½	540/690	..

* Under French protection at Bizerta. † Training ship.

4 sloops, 4 gunboats, 4 river gunboats, 21 minesweepers, 13 despatch vessels, about 25 C.M.B.s (some may be building), some submarine chasers, and miscellaneous other craft. 2 coastguard vessels are building in Italy (Ansaldo, Genoa).

SPAIN.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Side. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	ins.	ins.			knots.	tons.	
b.	Jaime I.	14,224	459¼	78¾	25½	15,500 P.T. Y.	Ferrol	1914	1921	..	8–5 K.S. / 2–1	10 (heavy) 3 (sec.)	8 *12-in.*, 20 *4-in.*, 4 *3-pr.*, 4 *3-pr.* A.A., 2 M.	—	20·2 *t*	1850 / 20	854
l. cr. ,,	Canarias Baleares	10,000	636	64	17·4	90,000 P.T.(G.) Y.	Ferrol	1931 1932	Bdg.	..	4 / 3	1	8 *8-in.*, 6 *4·7-in.*, 4 *4·7-in.* A.A., 8 *2 pr.* A.A., 2 seaplanes; 1 catapult.	12 21-in. (T.)	33·0	— / 2750	700
,, ,, ,,	Miguel de Cervantes Almirante Cervera Libertad (*ex*-Principe Alfonso)	7475	579½	54	16½	80,000 P.T.(G.) Y.	Ferrol	1928 1925 1925	1930 1928 1927	..	3 / —	..	8 *6-in.*, 4 *4-in.* A.A., 2 *3-pr.*, 1 M.	12 21-in. (T.)	33·0	— / 1680	560
,,	Republica (*ex*-Reina Victoria Eugenia)	4857	462	50	15¾	25,500 P.T.	Ferrol	1920	1922	..	3–1½ / —	3	9 *6-in.*, 4 *3-pr.* A.A., 1 *3-in.*, 4 M., 1 L.	4 21-in.	25·5	1200 / 230	404
,,	Mendez Nuñez	4509	462	46	14½	45,000	Ferrol	1922	1924	..	3	..	6 *6-in.*, 4 *3-pr.* A.A., 4 M.	12 21-in. (T.)	29	800 / 500	320
g.b. ,, ,,	Eduardo Dato Jose Canalejas Antonio Canovas del Castillo	1335 (normal)	253½	33½	11¼	1700	Ferrol	1923 1922 1922	1925 1924 1923	..	..	..	4 *4-in.*, 2 *3-pr.*, 2 M.	—	15	324 / —	131
,, ,,	Lauria Laya	787 (normal)	213¾	30	9½	1100 Y	Cartagena	1912 1911	1912 1911	..	..	..	4 *3-in.*, 2 M.	—	14·0	148 / —	121
s.c.	Dédalo	11,385	418	55	23	3000	..	..	1922	..	..	..	2 *4·1-in.*, 4 *3-in.*, A.A., 25 seaplanes	—	13	1000 / —	350

Motor-launches, M 1, 2, 4, 5, 6; H 2, 3, 4, 40 tons. Sailing Training ships: Sebastian Elcano (1928), 3500 tons, 800 H.P. (Diesel), 9·5 knots; Galatea (*ex*-Clarastella), 2500 tons, bought in Italy. Nine armed trawlers (built in Britain). Eight fishery protection vessels. Three C.M.B.s. Submarine salvage vessel Kanguro (1917), 2750 tons, 10 knots, four 2-pr. Surveying ship Giralda (1894), 2400 tons, 20 knots, two 6-pr. guns. Three coastguard patrol vessels, 250 tons, authorised.

SWEDEN.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.	**Aran**	3361	287	49¼	16·7	7000 Y. *t*	Gothenburg	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·3-in.*, 6 *5·9-in.*, 10 *6-pr.*, 1 *1-pr.*	2 sub. 18-in.	17·2 *t*	300 / —	287
,,	**Drottning-Victoria**	6899	396·7	61	21½	22,000 (G.) Y.	Gothenburg	1917	1921	666,000	8–6 K.S.	1½	4 H.S.	..	8 K.S.	5 K.S.	4 *11-in.*, 8 *5·9-in.*, 6 *3-in.*, 2 *6-pr.*, 2 M.	—	23·0	690 / 98	450
a.c.	**Fylgia**	4060	377·6	48·6	20·6	12,444 Y. *t*	Stockholm	1905	1907	385,700	4 K.S.	2	..	..	5 K.S.	5 K.S.	8 *6-in.*, 10 *6-pr.*, 2 *1-pr.*	2 sub. 18-in.	22·7 *t*	900 / —	328
Hangar Cruiser	**Gotland**	4527	442	50·6	14·7	33,000 (G.)	Gothenburg	1931	Bldg. est. 1934	910,000 (estimated)	..	..	..	..	..	..	6 *6-in.*, 4 *3-in.* A.A., 4 M., 100 mines, 8 aeroplanes, 1 catapult	6 21-in.	27·0	oil	453
c.d.s.	**Gustav V.**	6889	396·7	61	21½	22,000 (G.) Y.	Malmö	1918	1921	666,000	8–6 K.S.	1½	4 H.S.	..	8 K.S.	5 K.S.	4 *11-in.* 8 *5·9-in.*, 4 *3-in.*, 2 *6-pr.*, 2 M.	—	23·0	690 / 98	450
,,	**Manligheten**	3361	287	49¼	17·4	7400 Y.	Malmö	1903	1904	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·3-in.*, 6 *5·9-in.*, 8 *6-pr.*, 1 *1-pr.*	2 sub. 18-in.	17·0	300 / —	287
,,	**Oscar II**	4085	313·6	50·5	18	9000 Y.	Gothenburg	1905	1907	..	6 K.S.	2	6 K.S.	6 K.S.	7½ K.S.	5 K.S.	2 *8·2-in.*, 8 *5·9-in.*, 8 *6-pr.*, 1 *1-pr.*	2 sub. 18-in.	18·0	500 / —	330
,,	**Sverige**	6889	392·7	61	21½	20,000 tur. Y.	Gothenburg	1915	1917	666,000	8–6 K.S.	1½	4 K.S.	..	8 K.S.	5 K.S.	4 *11-in.*, 8 *5·9-in.*, 6 *3-in.*, 2 *6-pr.*, 2 M.	—	22·5	690 / 98	450
,,	**Tapperheten**	3361	287	49¼	17·7	6000 Y.	Malmö	1901	1903	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·3-in.*, 6 *5·9-in.*, 10 *6-pr.*, 1 *1-pr.*	2 sub. 21-in.	16·5	300 / —	287
,,	**Wasa**	3361	287	49¼	17	6000 Y.	Stockholm	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·3-in.*, 6 *5·9-in.*, 10 *6-pr.*, 1 *1-pr.*	2 sub. 21-in.	16·5	300 / —	287

Gustav V. and Sverige have been reconstructed and modernised (1929–33). Drottning-Victoria is also to be reconstructed Two older coast-defence ships, Oden, Thor (1897, 1899) (reconstructed 1915–16), 3297 tons, 16 knots, 5500 H.P. 2 10-in., 6 4·7-in., 8 6-pr. guns. Minelayer Clas Fleming, 1800 tons, 4 4·7-in., 20 knots, 100 mines; Vedette boats (employed as minesweepers), Sökaren, Sveparen, Sprängeren (1918), and 12 others. Jagaren, Kaparen, Snapphanen and Väktaren, building, 250 tons, 177 ft. long, 24 knots, 2 3-in. Torpedo gunboats, Jacob, Bagge, Oernen, Psilander, 830 tons, 2 4·7-in., 1 torpedo tube, 20 knots. Gunboat Svensksund (1891), 354 tons. Depôt ship for submarines, Svea, 3300 tons. Aircraft depôt ship Dristigheten (1901), 3620 tons. Depôt Ships:—Niord (1898), 3297 tons; Göta, 3350 tons. Sailing training ships: Af. Chapman, Najaden, Jarramas and Falken.

UNITED STATES.—Battleships.

Class.	NAME. Date for Scrapping and Replacement under Washington Treaty (1922).*	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost. §	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Arizona** † 1937	32,600	608	106¼	27½	33,376 B. & W. P. tur.	New York (Navy Yard)	1915	1916	1,485,000	14–8 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (45 cal.), 12 *5-in.* (51 cal.), 8 *5-in.* (25 cal.) A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 2 L., 2 catapults, 3 aeroplanes	—	21·0	— / 2322	1400
b.	**Arkansas** * 1935	26,100	562	106	26	30,000 P. tur.	New York (S.B. Co.)	1911	1912	964,000	11–5 K.S.	3	..	8–6 K.S.	11 K.S	6½	12 *12-in.* (50 cal.), 16 *5-in.* (51 cal.), 8 *3-in.* (50 cal.) A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	—	20·5	— / 5100	1430
b.	**California** 1941	32,600	624	97½	30½	28,500 tur. electric drive	Mare Island (Navy Yard)	1919	1921	2,620,000	14–8 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.* (51 cal.), 8 *5-in.* (25 cal.) A.A., 4 *6-pr.*, 2 M., 2 *1-pr.*, 2 catapults, 3 aeroplanes	2 (sub.) 21-in.	21	— / 4656	1412
b.	**Colorado.** 1942	32,500	624	97½	30½	27,300 B. & W. tur. electric drive	New York (S.B. Co.)	1921	1923	1,383,000	13½–12 K.S.	..	..	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.* (51 cal.), 8 *5-in.* (25 cal.) A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes	2 (sub.) 21-in.	21·0	— / 4570	1407

b.	**Idaho** ‡ . 1939 (Particulars prior to modernisation)	. 30,800	624	97⅓	29	32,000 B. & W. P.T.	New York (S.B. Co.)	1917	1919	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.* (51 cal.), 8 *3-in.* (50 cal.) A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 2 L., 2 catapults, 3 aeroplanes	2 (sub.) 21-in.	21	— / 3271	1374
b.	**Maryland** . 1941	. 31,500	624	97½	29⅔	27,300 B. & W. tur. (G.) and electric drive	Newport News	1920	1921	1,383,000	13½–12 K.S.	..	..	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.* (51 cal.), 8 *5-in.* (25 cal.) A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes	2 (sub.) 21-in.	21	— / 4570	1407
b	**Mississippi** ‡ . 1938 (Particulars prior to modernisation)	. 30,100	624	97⅓	28½	32,000 B. & W. C.T. (G.)	Newport News	917	1917	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.* (51 cal.), 8 *3-in.* (50 cal.) A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes	2 (sub.) 21-in.	21	— / 3271	1374

* See note * on p. 269. † See note † on p. 269. ** See note ** on p. 269.

‡ Now being modernised. The particulars given above are prior to modernisation. (See ‡, p. 268.) || Will be increased by about 3000 tons after modernisation.

§ The sums given in this column are exclusive of the cost of armour and armament according to the system of making appropriations in the estimates.

UNITED STATES.—Battleships—*continued*.

Class.	NAME. Date for Scrapping and Replacement under Washington Treaty.**	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Nevada § . 1936 *	29,000	583	108	$27\frac{1}{2}$	25,000 Y. P. tur.	Quincy, Mass. (Fore River)	1914	1916	1,211,342	$13\frac{1}{2}$–8 K.S	$1\frac{1}{2}$–3	..	$13\frac{1}{2}$ K.S.	18–16 K.S.	..	10 *14-in.* (45 cal.), 12 *5-in.* (51 cal.), 8 *5-in.* (25 cal.) A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 L., 2 catapults, 3 aeroplanes	—	20·5	— / 2000	1320
b.	New Mexico ‡ 1939 (Particulars prior to modernisation)	30,000	624	$97\frac{1}{3}$	$28\frac{1}{3}$	27,500 B. & W. Electric drive	New York . (Navy Yard)	1917	1918	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.* (51 cal.), 8 *3-in.* (50 cal.) A.A., 4 *6-pr.*, 2 *1 pr.*, 2 M., 2 catapult, 3 aeroplanes	2 (sub.) 21-in.	21·0	— / 3271	1414
b.	New York * . 1935 *	27,000	573	106	26	28,100 B. & W. recip.	New York . (Navy Yard)	1912	1914	1,315,114	12–4 K.S.	3	9 K.S.	10 K.S.	14–8 K.S.	6 K.S.	10 *14-in.* (45 cal.), 16 *5-in.* (51 cal.), 8 *3-in.* (50 cal.) A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	—	21·0	— / 5200	1450
b.	Oklahoma § . 1936 *	29,000	583	108	$28\frac{1}{2}$	25,300 B. & W. recip.	New York . (S.B. Co.)	1914	1916	2,200,000	$13\frac{1}{2}$–8 K.S.	$1\frac{1}{2}$–3	..	$13\frac{1}{2}$ K.S.	18–16 K.S.	..	10 *14-in.* (45 cal.), 12 *5-in.* (51 cal.), 8 *5-in.* (25 cal.) A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes	—	20·5	— / 2000	1320
b.	Pennsylvania † 1937	32,100	608	$106\frac{1}{4}$	28	31,500 B. & W. Cur. tur.	Newport News	1915	1916	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (45 cal.), 12 *5-in.* (51 cal.), 8 *5-in.* (25 cal.) A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes.	—	21·0	— / 2300	1380
b.	Tennessee . . 1940	32,300	624	$97\frac{1}{2}$	$30\frac{1}{4}$	26,800 B. & W. Tur electric drive.	New York (Navy yard)	1919	1920	2,620 000	14–8 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.* (51 cal.), 8 *5-in.* (25 cal.) A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes	2 (sub.) 21-in.	21·0	— / 4656	1412

b.	**Texas*** 1935**	27,000	573	106	26	28,100 recip.	Newport News	1912	1914	1,166,000	12–4 K.S.	3	9 K.S.	10 K.S.	14–8 K.S.	6 K.S.	10 *14-in.* (45 cal.), 16 *5-in.* (51 cal.), 8 *3-in.* (50 cal.) A.A., 4 *3-pr.*, 2 *1-pr.*, 2 M., 1 catapult, 3 aeroplanes	—	21·0	— / 5200	1450
b.	**West Virginia** 1942	31,800	624	97½	30	27,300 B. & W. tur. electric drive.	Newport News	1921	1923	1,383,000	13½–1 K.S.	..	..	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.* (51 cal.), 8 *5-in.* (25 cal.) A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 2 catapults, 3 aeroplanes	2 (sub.) 21-in.	21·0	— / 4570	1407

Battleship Utah was converted to a mobile target ship in 1931 in accordance with the London Naval Treaty, and the battleship Wyoming was converted to a training ship (speed 18 knots) in 1931 in accordance with London Naval Treaty.

* Modernised in 1927. Modernisation included fitting of bulge protection, protection of decks against aerial attack, conversion to oil burning, installation of 3-in. A.A. battery, and addition of catapults. Cost about £600,000 each ship. Displacement increased about 3000 tons.

† Modernised in 1931. Modernisation included fitting bulges, reboilering, increasing elevation of turret guns, replacing former anti-aircraft batteries by 5-inch A.A. guns, new masts and new fire control.

‡ Taken in hand for modernisation 1931. New Mexico and Mississippi completed 1933. Idaho to complete 1834. Modernisation includes fitting, increased deck protection increasing elevation of turret guns, installation of eight 5-in. A.A. guns, reboilering, fitting of new turbines (the electric drive in New Mexico has been replaced by turbine machinery), alterations to masts and bridges, and fitting of bulges. The alterations will add about 3000 tons to the displacement.

§ Modernisation in 1929. Alterations include fitting of bulges, deck protection, tripod masts, increasing elevation of turret guns, fitting a new 5-in. anti-aircraft battery.

The modernisation of California, West Virginia, Colorado, Maryland, and Tennessee is projected.

**** The London Naval Treaty (1930) suspended replacement of capital ships between the years 1931–36 inclusive.**

UNITED STATES.—Aircraft Carriers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
A.C.	Ranger CV4	13,800	727 (on W.L.)	80	19	53,500 (G.)	Newp't News S. B. Co.	1933	Bldg. est. 1934	about * 4,000,000	..	..	8 *5-in.* A.A., 76 aircraft	..	29¼	..	1434
A.C.	Lexington	33,000	880	104	31¼	180,000 tur. electric	Quincy, Mass. (Fore River)	1925	1927	9,000,000	..	..	8 *8-in.* (55 cal.), 12 *5-in.* (25-cal.) A.A. 4 *6-pr.* Operates about 80 aircraft. Fitted with catapult.	..	33½	Oil	..
A.C.	Saratoga	33,000	888	106	30	180,000 tur. electric	N.Y. Shipbuilding Co.	1925	1927	9,000,000	..	..	8 *8-in.* (55-cal.), 12 *5-in.* (25 cal.) A.A., 4 *6-pr.* Operates about 80 aircraft. Fitted with a catapult	..	33½	Oil	..
A.C.	Langley †	11,500	542	65½	19	72,000 tur. electric	Mare Island Navy Yard	1912	1922 as aircraft carrier	..	..	..	4 *5-in.* (51 cal.), operates 32 aircraft, 2 catapults.	—	14½	— / 2000	411

For particulars of Aircraft Tenders and Repair Ships, see page 271.

*** The estimated cost has been increased from 19 million dollars to 21 million dollars to allow for the conversion of the vessel from a "flush-deck" type of carrier to an "island" type of carrier during construction.**

† Formerly Collier Jupiter, converted 1921 at Norfolk Navy Yard.

UNITED STATES.—Cruisers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost (exclusive of armament).	Armour. Belt. / Deck	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
..	Quincy	10,000 estimated	..	..	..	..	Bethlehem S. B. Corp., Quincy	..	Bldg est. 1936	1,860,000 estimated	..	..	8-*in.* guns	..	..	..	..
Astoria Class	Tuscaloosa						New York, S. B. Co.	1933	Bldg. est. 1934	2,090,000 estimated							
	San Francisco						Mare Island Navy Yard	1933	Bldg. est. 1934	2,090,000 estimated							
	New Orleans	10,000 estimated	578 (overall) 573 (on W.L.)	61¾	19½	107,000 (G.)	New York Navy Yard	1933	1933	2,460,000	reported to be more heavily armoured than the earlier 10,000-ton cruisers	..	9 8-*in.* (55 cal.), 8 5-*in.* (25 cal.) A.A., and 10 smaller, 2 catapults, 4–6 aircraft	—	32½	oil	602
	Astoria						Puget Sound Navy Yard	1933	Bldg est. 1934	2,460,000							
	Minneapolis						Philadelphia Navy Yard	..	Bldg est. 1934	2,460,000							
Portland Class	Portland	9800	584 (on W.L.)	66	17½	107,000 (G.)	Bethlehem S. B. Co. Quincy	1932	1933	2,210,000			9 8-*in.* (55 cal.), 8 5-*in.* (25 cal.) A.A., and 10 smaller, 2 catapults, 4–6 aircraft	6 21-in.	32½	oil	602
	Indianapolis	9950					New York S. B. Co.	1932	1932	2,250,000							
Chester Class	Northampton	9050					Bethlehem, S. B. Corp., Quincy	1929	1930	2,180,000							
	Chester	9200					American Brown Boveri Elec. Corp.	1929	1930	2,230,000							
	Louisville	9050	600	65–66	16·3–17·6	107,000 P.T. (G.)	Puget Sound Navy Yard	1930	1931	2,290,000	3 / ..	..	9 8-*in.* (55 cal.), 4 5-*in.* (25 cal.) A.A., 2 3-*pr.*, 2 catapults, 4-6 seaplanes	6 21-in. (T)	32¼	oil	611
Augusta Class	Chicago	9300					Mare Island Navy Yard	1930	1931	2,280,000							
	Houston	9050					Newport News S. B. & D. D. Co.	1929	1930	2,170,000							
	Augusta	9050						1930	1931	2,170,000							
Omaha Class	Cincinnati	7050	555½	55⅓	13½	90,000 P.T. (G.)	Tacoma, Wash.	1921	1924	1,730,000	3 / —	..	12 6-*in.* (53 cal.) (Cincinnati 10 6-*in.*), 4 3-*in.* (50 cal.) A.A., 2 3-*pr.*, 2 catapults, 2 aeroplanes	6 21-in. (T)	33·7	— / 1800	450
	Concord						Philadelphia (Cramp)			1,742,000	..						
	Detroit	7050	555½	55⅓	13½	90,000 C.T. (G.)	Bethlehem S. B. Co. Quincy	1922	1923	1,584,000	3 / — ..	..	10 6-*in.* (53 cal.), 4 3-*in.* (50 cal.) A.A., 2 3-*pr.*, 2 catapults, 2 aeroplanes	6 21-in. (T)	33·7	— / 1800	450

Omaha Class	Trenton .	7050	555½	55⅓	13½	90,000 P.T. (G.)	Philadelphia (Cramp)	1923	1924	1,823,000	3 — ..	..	12 *6-in.* (53 cal.) (Marblehead, 11 *6-in.*), 4 *3-in.* (50 cal.) A.A.; 2 *3-pr.*, 2 catapults, 2 aeroplanes.	6 21-in. (T.)	33·7	— 1800	450
	Marblehead							1923	1924	1,810,000							
	Memphis .							1924	1925	1,838,000							
	Milwaukee						Tacoma, Wash.	1921	1923	1,794,000							
	Omaha .	7050	555½	55⅓	13½	90,000 P.T. (G.) (Raleigh) C.T. (G.)	Tacoma, Wash.	1920	1923	1,823,000	3 — ..	..	10 *6-in.* (53 cal.) (Omaha, 12 *6-in.*), 4 *3-in.* (50 cal.) A.A.; 2 *3-pr.*, 2 catapults, 2 aeroplanes	6 21-in. (T.)	33·7	— 1800	450
	Raleigh .						Bethlehem S.B. Co., Quincy	1923	1924	1,616,000							
	Richmond						Philadelphia (Cramp)	1921	1923	1,742,000							
Pensacola Class	Salt Lake City	9100	585½	64	16	107,000 P.T. (G.)	New York S.B. Co.	1929	1929	3,400,000	3 — ..	..	10 *8-in.* (55 cal.), 4 *5-in.* (25 cal.) A.A., 2 *3-pr.*, 2 catapults, 4 planes	6 21-in. (T.)	32½	— 3000	603
	Pensacola.						Navy Yard, New York	1929	1930								

The ordinary annual appropriation for 1933-4 provides for laying down Cruiser Vincennes (10,000 tons, with 8-in guns) after January 1, 1934, the contract being placed with Bethlehem S.B. Co., for £2,410,000. Another 8-in gun cruiser (No. CA 41) is authorised and may be laid down in 1935. In addition, the National Industrial Recovery Act authorised in July, 1933, at the cost of £49,000,000, the construction of four cruisers, Savannah, Nashville, Brooklyn, and Philadelphia (10,000 tons with 6-in. guns), two aircraft carriers, Yorktown and Enterprise (10,000 tons), two gunboats, Erie and Charleston, four submarines (see page 301), four destroyers of 1850 tons, and sixteen destroyers of 1500 tons (see page 298). Contracts have been placed as follows:—the two aircraft carriers (Newport News S B. Co., £3,910,000 each), the cruisers, Savannah and Nashville (New York S.B. Co., £2,410,000 each), crusier Brooklyn (New York Navy Yard), cruiser Philadelphia (Philadelphia Navy Yard), gunboat Erie (New York Navy Yard), gunboat Charleston (Charleston Navy Yard). For destroyers and submarines, see pages 298 and 301.

Old Cruiser.—Rochester (1893), 7350 tons, 4 8-in., 8 5-in., 2 3-in. A.A., 2 3-pr., 5360 H.P., 21 knots. Listed for disposal.

Gunboats.—Tulsa (1923), and Asheville (1920), 1270 tons, 12 knots, 3 4-in., 2 3-pr., 3 1-pr.; Sacramento (1914), 1140 tons, 12½ knots, 3 4-in., 2 3-pr., 2 1-pr.; Fulton (1914), 1160 tons, 12 knots, 2 3-in. A.A.; and 6 others, used for training purposes.

River Gunboats.—Guam (1927), Tutuila (1928), 370 tons, 14 knots, 2 3-in., 8 M.; Palos, Monocacy (1914), 180 tons, 13¼ knots, 2 3-in.; Panay, Oahu (1928), 450 tons, 15 knots, 2 3-in.; Luzon, Mindanao (1928), 575 tons, 16 knots, 2 3-in.

Minelayers.—Yosmite *ex*-San Francisco (1890), 3700 tons, 19½ knots, 3 5-in., 2 6-pr., 2 3-in. A.A., 300 mines; Baltimore (1889), 3950 tons, 20 knots, 4 5-in., 4 6-pr., 2 3-in. A.A., 2 1-pr., 300 mines; Oglala (1918), 4200 tons, 20 knots, 1 5-in., 2 3-in. A.A., 350 mines; 12 light mine-layers, *ex*-T.B.D.'s.

Minesweepers.—37 in number, "Bird" class (1918, 1919), 840 tons, 1400 H.P., 14 knots, 2 3-in. A.A. guns authorised but not carried. 6 more are equipped as submarine salvage vessels (Chewink, Falcon, Mallard, Ortolan, Pigeon and Widgeon, built 1914–18, 1210–1270 tons, 14 knots).

Aircraft Tenders.—Patoka (1919), 16,800 tons, 10·9 knots, 2 5-in.; Heron (minesweeper) (1918), 950 tons, 14 knots, 2 3-in. A.A.; Jason (1913), 19,250 tons, 14·3 knots, 4 4-in., 27 planes. Aroostook (1918) (minelayer), 4950 tons, 20 knots, 1 5-in., 2 3-in.

Aircraft Repair Ship.—Wright, 9553 tons, 15 knots, 6000 H.P., 2 5-in., 2 3-in. A.A., 20 planes.

Destroyer Tenders.—Dobbin (12,450 tons); Whitney (12,450 tons), and Melville (7150 tons), 16 knots, 8 5-in., 4 3-in.; Altair, Denebola and Rigel, 7,600 tons, 10½ knots, 4 5-in., 4 3-in.; Black Hawk, 8900 tons, 13 knots, 4 5-in.; Bridgeport, 11,750 tons, 12½ knots, 8 5-in.

Submarine Tenders.—Holland (1926), 11,570 tons, 16 knots, 8 5-in., 4 3-in. A.A., 2 6-pr.; Bushnell (1915), 2896 tons, 14 knots, 4 5-in.; Canopus (1919), 6615 tons, 13 knots, 2 5-in.; Camden (1900), 7596 tons, 12 knots, 4 4-in.; Savannah (1899), 6110 tons, 10½ knots, 4 5-in.; Beaver (1910), 5320 tons, 16½ knots, 4 5-in.; Argonne (1921), 9005 tons, 15 knots, 4 5-in.

Repair Ships.—Medusa (1924), 8089 tons, 16 knots, 4 5-in., 2 3-in. A.A., 2 6-pr.; Vestal, Prometheus (1909), 6378 tons, 16 knots, 4 5-in., 1 3-in. 25 submarine chasers (80 tons), mounting 1 3-in. gun. Monitor (employed as training ship).—Cheyenne (*ex*-Wyoming) (1902), 2800 tons.

5 Store ships, 6 Cargo ships, 3 Transports, 3 Hospital ships, 25 Patrol vessels (Eagle class, 430 tons, 18 knots, 2 4-in., 1 3-in. A.A.), Craneship; Kearsage (capacity 250 tons), 2 ammunition ships, and other auxiliaries.

SHIPS OF THE LESSER NAVIES.

Albania.—Two gunboats (ex-German), 230 tons, 4 motor launches (built in Italy), 40 tons.

Austria.—Patrol vessels: Neretva, Compo (1918), 130 tons, 16 knots; Fogas (1915), 62 tons, 16 knots, and Pozsony (1915), 130 tons, 16 knots. These vessels have been disarmed and are unserviceable.

Bulgaria.—Under the terms of the naval clauses of the Peace Treaty, Bulgarian warships of all classes, existing or under construction, were surrendered to the Allied and Associated Powers or broken up. All vessels are under the Ministry of Commerce for police and preventive duties; six torpedo boats, two minesweepers and six motor boats of little value.

China.—Cruisers: Ning Hai (Kobe, 1932) and Ping Hai (Shanghai, building), 2400 tons, 360 ft. length, 10,500 H.P., 24 knots, six 5·5-in. and six 3·1-in. guns, four 21-in. torpedo tubes; Chao Ho (Elswick, 1912, 2600 tons), Ying Jui (Barrow, 1912, 2460 tons, 20 knots)—two 6-in., four 4-in., two 3-in., six 3-pr., two 1-pr., two 18-in. torpedo tubes; Hai Yung, Hai Chou, and Hai Chen (Germany, 1897–1898, 2950 tons, 19½ knots)—three 5·9-in., eight 4-in. and smaller, one submerged torpedo tube; Hai Chi (Armstrong's, 1899, 4300 tons, 24 knots)—two 8-in., ten 4·7 in., twelve 3-pr., ten maxims, five torpedo tubes. Destroyers: Chien Kang, Hsiao An, and Yu Chang, of 390 tons, speed 32 knots, armament: two 3-in., four 3-pr., and two 18-in. T.T. Torpedo boats: Eight (62–90 tons). Gunboats: Yat Sen (1931), 1650 tons, 20 knots, two 6-in., four 3-in., Kianing, Haining (1933), 300 tons, and fourteen others. Funing, Suining (300 tons, 12 knots, two 3-in. guns), and several others building at Shanghai. River gunboats: Forty-two. Also several dispatch vessels and torpedo gunboats. There are, in addition, a few gunboats and miscellaneous vessels belonging to the water-police of the Kwang Tung Province. One seaplane carrier, Teuck Sheng, building.

Colombia.—Gunboats: Presidente Mosquera, 200 tons; Cartagena, Santa Marta, Barranquilla (Yarrows, 1930), length 130 feet, speed 15½ knots, one 3-in. gun. River gunboats: General Nerino and Esperanza, 400 tons, 15 knots. Motor boats: Cauca (1913), 50 tons, four Guardacostas (Yarrow, 1913), 20 tons. Patrol vessels: Boyaca and Pechincha. Six revenue cutters building at Thornycroft's.

Cuba.—Light cruiser, Cuba, 2055 tons, 6000 H.P. 18 knots, two 4-in., four 6-pr., four 3-pr., four 1-pr., 2 M. Training ship: Patria (1911), 1200 tons, 16 knots. Gunboats: Habana, Pinar del Rio, Villas, Matanzas (1912), 80 tons, 12 knots, one 1-pr.; 24 de Febrero, 10 de Octubre (1911), 218 tons, 12 knots, three 3-pr.; Baire (1906), 500 tons, 14 knots, four 3-in., two 3-pr., 1 M.; Yara (1895), 450 tons, 12 knots, two 6-pr.; 20 de Mayo (1895), 200 tons, 12 knots, two 3-pr., two 1-pr.; Enrique Villuendas (1899), 178 tons, 16 knots, two 3-pr. One patrol boat building, 115 tons, 3 guns.

Czecho-Slovakia.—There are two river gunboats carrying two 3-in. guns for training purposes and four small minelayers.

Ecuador.—The torpedo cruiser Libertador Bolivar (1896), disarmed and of no fighting value, mine-laying patrol vessels Tarqui and Enrique Valdez (50 tons), and gunboat Cotopaxi (1884), 700 tons.

Estonia.—Destroyers: Vambola (*ex*-Kapitan Kingsbergen) (1918), 1260 tons, 35 knots, four 4-in. guns, 2 M., one 2-pr., 9 T.T., 80 mines, and Lennuk (*ex*-Avtroil) (1917), 1400 tons, 35 knots, five 4-in. guns, one 2-pr., 9 T.T., 80 mines. Mine-layers Kalev and Olev, minesweepers Sourop and Ristna, two ice-breakers, and Peipus Lake gunboats Ahti and Tartu. Torpedo boat Sulev (*ex*-German A 32) (1917), 243 tons, 26 knots, two 3-in., 2 torpedo tubes; gunboat Laene, river gunboat Mardus.

Finland.—Patrol boats Klas Horn (1892) (*ex*-Posadnik), Uusimaa (1919), Hämeenmaa (1918), Matti Kurki (1892) (*ex*-Voevoda), Karjala (1918) (*ex*-Filin), and Turunmaa (1918) (*ex*-Orlan); 7 C.M.B.'s; 6 ice-breakers, and three mine-sweepers, and 21 motor launches. Two armoured gunboats (4-in. belt), Väinämöinen and Ilmarinen, length 305 feet, 4000 tons, 4000 H.P. (Diesel-electric), 15 knots, four 10-in. guns, eight 4·7-in guns, built at A/B Maskin and Brobyggnads, Abo (1932–3). Submarines Iku-Turso, Vetehinen and Vesihiisi (Abo 1930), 450 tons, speed 15 knots surface, 9 knots submerged, one 3-in. gun; Saukko (Helsingfors, 1930), 99 tons, two torpedo tubes. Sailing training-ship Suomen Joutsen (*ex*-German Oldenburg) An ice-breaker and submarine depôt ship is projected.

Hayti.—Special service vessels, Nord Alexis, 1230 tons, two 4·7-in.; Veretieres, 270 tons; 17 Decembre, 851 tons; Pacifique, 488 tons.

Hungary.—Patrol vessels: Sopron, Debreczen, 138 tons, two 3-in., 4 M.; Kecskemet, Szeged and Gyor, 131 tons, four 3-in., 4 M.; Birago, 59 tons, one 3-in., 4 M.; also 12 motor launches.

Latvia.—Gunboat Virsaitis (*ex*-German M68), 480 tons, two 3-in., two 6-pr., one 3-in. A.A., one torpedo tube; 1 ice-breaker, Krisjanis Valdemars; 2 submarines (1927), Ronis and Spidola, $\frac{390}{514}$ tons $\frac{\text{surface}}{\text{submerged}}$ displ., $\frac{14\frac{1}{2}}{9\frac{1}{4}}$ knots, one 3-in. A.A., 2 M., 6 torpedo tubes; 2 mine-sweepers, Imanta, Viesturs, 225 tons, 14 knots, one 3-in., 4 M., 30 mines, completed in 1926; Surveying vessel, Hidrografs.

Manchukuo.—Gunboats building in Japan; Tatung, Hourin Enmin, Humin, and Pumin (200 tons, 13 knots).

Mexico.—Coast defence vessel Anahuac, 3162 tons, 15 knots two 9·4-in., four 4·7-in., four 6-pr., 2 M., 2 L.; gun-vessels, Tampico and Vera Cruz (Elizabeth Port, New Jersey, 1903); displacement, 980 tons; armament, two 4-in. Q.F., four 6-pr.; 16 knots; fitted to serve as transports for 200 troops, Bravo 1200 tons; 2,600 I.H.P.; 17 knots (Leghorn, 1904), and Aguas Prieta, 1200 tons; 1800 I.H.P.; 15 knots. Two revenue cutters. Four patrol boats.

Paraguay.—Gunboats: Humayta and Paraguay (1931), 740 tons, 17 knots, four 4·7-inch, four 3-inch A.A. guns; two older, Capitan Cabral and Tacuari. Two despatch vessels and two vedettes.

Persia.—Gunboats: Babr and Palang (Italy, 1932), 950 tons, 205 feet long, 1900 H.P. (Diesel), 15 knots, two 4-in. and two 3-in. A.A. guns. Four motor patrol boats built in Italy (1932). Semorg, Chahbaaz, Karkas and Sharock, 330 tons, 900 H.P. (Diesel), 15 knots, two 3-in guns. Also several old small gunboats and motor dhows.

Peru.—Almirante Grau and Coronel Bolognesi, cruisers 3200 tons; (Barrow, 1906); two 6-in., eight 3-in., eight maxim; 2 submerged torpedo tubes; 24 knots; converted to oil-burning 1925; also Lima (1880, refitted 1920) (parent ship for submarines), 1790 tons. Gunboat America, 200 tons, 14 knots. Destroyer, Rodriguez, 500 tons, 28 knots. Submarines R1–4, built in U.S.A. (1926–9), and R5 and R6 authorised, $\frac{576}{682}$ tons, $\frac{14\frac{1}{2}}{10}$ knots, one 3-in., 4 torpedo tubes. Two destroyers are projected.

Poland.—Five *ex*-German torpedo boats (355 tons) for police purposes. Gunboats Komendant Pilsudski and General Haller, 350 tons, 14 knots, built in Finland (1920). Training ship Iskra. Monitors Warszawa, Horodyszcze, Krakow, Wilno, Torun, Pinsk. Twenty motor boats. Two destroyers, Burza, Wicher, completed 1931–2 at Chantiers Navals Français, 1515 tons, 33,000 H.P., 33 knots, four 5·1-in., one 2·9-in. A.A., 6 torpedo tubes. Three submarine minelayers built in France, Rys, Zbik, and Wilk, completed 1931–2; $\frac{964}{1230}$ tons, $\frac{1800}{1200}$ H.P., 14 knots surface, 9 knots submerged; one 4-in., one 2-pr., 6 torpedo tubes, 40 mines. A minelayer is building in France, and four mine-sweeping trawlers in Poland. A submarine is projected.

Portugal.—The cruiser Adamastor, 1760 tons, 18 knots (Leghorn, 1897, reconditioned 1925), two 4·7-in., four 4·1-in., 3 torpedo tubes (14-in.). The minelayer Vulcano (151 tons) (Thornycroft, 1909). Two sloops, about 1200 tons, sold out of the British Navy, Carvalho Araujo (*ex*-Jonquil) and Republica (*ex*-Gladiolus). Coast defence vessel Vasco da Gama (1876, reconstructed 1903), 3030 tons, 15·5 knots, two 8-in., one 6-in., one 3-in. Destroyers Tamega, Guadiana (1913–24), 700 tons, 11,000 H.P., 30 knots, one 4-in., two 3-in., two torpedo tubes. Submarines Foca, Golfinho, and Hidra (Laurenti); 260–389 tons, 13–8·5 knots, 2 T.T. Gunboats Damao and Zaire (1919), Diu and Lagos (1932), 400 tons, 700 H.P., 13 knots, two 3-in., two 3-pr., and there are 18 older ones.

New Construction (1930 *programme*).—1st class sloops: Alfonso de Albuquerque and Bartolomeu Diaz (building at Hawthorne Leslie, Newcastle), 1780 tons, 21 knots, four 4·7 in., two 3-in. A.A., four pom poms, two torpedo tubes. 2nd class sloops: Goncalo Velho and Goncalves Zarco (Hawthorne Leslie, Newcastle, 1933),

1045 tons, 16 knots, three 4·7-in., two pom poms. Pedro Nunes (building at Lisbon), 1080 tons, 16 knots, two 4·7-in, Destroyers: Vouga and Lima (Yarrow's, Scotstoun, 1933), Douro, Tejo and Dao (building by Yarrow's in Portugal), 1280 tons, 33,000 H.P., 36 knots, four 4·7-in., three 1·5-in A.A., two quadruple 21-in. torpedo tubes. Submarines: Delfin, Espardate, and one other (building at Vickers); surface condition, 870 tons, 2300 H.P. and 16 knots; submerged condition, 1000 tons, 1000 H.P. and 9¼ knots; one 4-in. gun, six 21-in. torpedo tubes.

Other ships including an aircraft carrier (5000 tons) are projected. The contract for an aircraft carrier was placed in Italy in 1931, but has been cancelled.

Rumania.—*River Monitors.*—Bucovina (1916), 540 tons, 12 knots, two 4·7-in., two 3-pr., two 11-pr. A.A.; Ardeal (1905), 440 tons, 10 knots, two 4·7-in., one 3-pr., one 3·5-in. A.A.; Basarabia (1915), 530 tons, 12 knots, two 4·7-in., two 3-pr., two 11-pr. A.A.; Lascar Catargiu, Ioan Bratianu, Milhail Kogalniceanu, Alexandru Lahovari (1907–08), 670 tons, 13 knots, three 4·7-in., two 3-pr., one 3-in. A.A., 2 M.

Flotilla Leaders.—Regele Ferdinand and Regina Maria (Naples, 1930, Thornycroft's design), 1785 tons, 38 knots; length 334¾ ft., five 4·7-in., three 2-pr. A.A.; two twin torpedo tubes. Marasti, Marasesti (*ex*-Italian Nibbio, Sparviero), 1917–18, 1460 tons, 35 knots, five 4·7-in., four 3-in. A.A., 2 M., 2 twin torpedo tubes, 50 mines.

Seven vedettes, 50 tons, 18 knots, one 3-pdr. gun.

Gunboats.—Stihi, Lepri Remus, Dumitrescu, Ghiculescu (1916–17, *ex*-French Magnonne, Friponne, Chiffonne, Impatiente), 350 tons, 15 knots, two 3·9-in., 2 M.

Submarine.—Delphin (Quarnaro, Fiume, 1932). Displacement, 640 tons surface, 817 tons submerged; speed 14 knots surface, 9·5 knots submerged, one 4·2-in. gun, 6 torpedo tubes.

There are also five armed motor boats, police craft (*ex*-Austrian T.B.s) Naluca, Sborul, and Zmeul, and seven armed launches.

A submarine depôt ship, Constanta, 2264 tons, two 4-in. A.A. guns (Fiume 1930).

Training ship, Nircea, 350 tons.

Siam.—The gunboats Ratnakosindr (1925), 920 tons, two 6-in., four 3-in. H.A., 12 knots; Bali and Sugrib (1900), 580 tons, 11·5 knots, one 4·7-in., five 6-pr., 2 M.; Sukhodaya (Vickers, 1930), 1030 tons, 13 knots, two 6-in., four 3-in. A.A. Two 380-ton, 27-knot destroyers, built at Kobe, Sua Gamron Sindhu and Sua Tayanchor. Phra Ruan (*ex*-British Radiant, 1917), 719 tons, 35 knots. Four torpedo boats (1908–13), 90 tons, 22 knots. Five coastal motor boats. Training ship Chao Phra (1919), 840 tons, 16 knots.

Turkey.—The old battleship Torghud Reis (*ex*-German Weissenburg, 1891), refitted 1927, 9900 tons, 17 knots, six 11-in., three 3-in., two 2·5-in. A.A., 2 submerged torpedo tubes. The battle-cruiser Yavouz Sultan Selim (*ex*-Goeben), 24,000 tons, 25

knots. Armament: ten 11-in., ten 5·9-in., eight 3·5 in., 2 M., 1 L., 4 submerged torpedo tubes. Light cruisers: Hamidieh (Elswick, 1904), 3830 tons, speed 22 knots, armament: two 5·9-in., four 3-in., four 3-pr., 2 torpedo tubes; Medjidieh (Philadelphia, 1903), refitted 1927, 3300 tons, speed 22 knots, armament: four 5·1-in., four 3-in., 4 M. Destroyers: Adatepe, Kocatepe (Ansaldo, Italy, 1931), 1430 tons, 39 knots, four 4·7-in. guns, six 21-in. tubes. Tinaztepe and Zafer (Cantiere Navale del Tirreno, Italy, 1932), 1450 tons, 38 knots, four 4·7-in. guns, six 21-in. tubes. Submarines Ikindji-in-Uni and Birindjiin-Uni (Fijenoord, Rotterdam, 1928), $\frac{433}{556}$ tons, $\frac{13\frac{3}{4}}{9\frac{1}{4}}$ knots, one 3-in., 1 M., 6 torpedo tubes. Dumlupinar (minelayer), (Monfalcone, 1931), 950 tons, 15 knots, 2400 H.P. surface, 1200 tons, 9½ knots, 1400 H.P. submerged, one 4-in. A.A., 4 torpedo tubes, 40 mines. Sakarya (Montfalcone, 1931), 740 tons, 15 knots 1500 H.P. surface, 925 tons, 9 knots, 1100 H.P. submerged, one 4-in, six torpedo tubes.

Uruguay.—Torpedo-gunboat (training ship) Uruguay (1910), 1400 tons; two 4·7-in., four 3-in.; two 18-in. torpedo tubes. Surveying ship Capitan Miranda. Gunboat Rio Branco.

Venezuela.—Old gunboats Mariscal Sucre (1125 tons). General Salom (750 tons). Miranda (200 tons), Brion (150 tons). Armed tug José Felix Ribas.

Yugoslavia.—Submarines Hrabri and Nebojsca, completed at Armstrong's 1928, displacement 975 tons surface, 1164 tons submerged; speed 15 knots surface, 10 knots submerged; mount two 4-in., 6 torpedo tubes. Smeli and Osvetnik, completed at Nantes, 1929; displacement 620 tons surface, 797 tons submerged, speed 14·5 knots surface, 9·25 knots submerged, carry one 4-in., one 2-pr., and 6 torpedo tubes. Two coastal motor boats, 38 knots, built at Thornycroft's, completed in 1927. Old cruiser Dalmacija (*ex*-German Niobe), refitted 1926, 2600 tons, is used as a gunnery and general training ship. There are four *ex*-Austrian river monitors, Vardar, Drava, Sava, Morava, 430–600 tons, mounting two 4·7-in.; eight *ex*-Austrian T.B.'s, two patrol boats, six mine-layers, six mine-sweepers); one seaplane depôt ship, Zmaj, 1870 tons, one training ship, two submarine depôt ships, and auxiliary craft.

One flotilla leader, Dubrovnik, built at Yarrow's, Scotstoun, completed 1932, length 371 feet, displacement 2400 tons, 42,000 S.H.P., speed 37 knots, carries four 5·5-in., 2 twin 2-pr., 2 triple 21-in. torpedo tubes.

BRITISH AND FOREIGN FLOTILLAS.

Great Britain.

Name or Number.	Built by.	Completed.	Dimensions. Length (Extreme).	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Standard Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).	Fuel Capacity. Oil.
FLOTILLA LEADERS.													
			ft. ins.	ft. ins.	ft. ins.		Tons.		Knots.				Tons.
Faulknor	Yarrow	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Exmouth	Portsmouth Dockyard	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Duncan	Portsmouth Dockyard	1933	317 9 (b.p.)	33 0	8 8	..	1400	36,000	35½	4 4·7-in. 1 3-in. A.A. 2 2-pr., 1 M., 4 L.	8	..	470
Kempenfelt	J. S. White	1931	317 9 (b.p.)	33 0	8 7	..	1390	36,000	35½				
Keith	J. S. White ..	1931	323 0	32 3	8 6	2	1400	34,000	35	4 4·7 in., 2 2-prs. 1 M., 4 L.	2 Q.	..	380
Codrington	Swan Hunter ..	1930	343 0	33 9	10 0	2	1540	39,000	35	5 4·7-in., 2 2-prs., 1 M., 4 L.	2 Q. 21"	..	425
Abdiel	Cammell Laird ..	1916	325	31 9	11 3	3	1310	36,000	34	3 4-in., 1 2-pr., 1 M., 4 L., Mine-layer.	—	130	515
Shakespeare	Thornycroft ..	1917	329	31 11	12 4	2	1480	40,000	36	5 4·7-in. 1 3-in. A.A. 2 2-pr. A.A. 1 M., 4 L.	2 T. 21"	182	500
Spenser	,, ..	1917											
Wallace	,, ..	1919											
Keppel	,, ..	1925											
Broke, *ex*-Rooke ..	,, ..	1925											
Bruce	Cammell Laird ..	1918	332 6	31 9	12 3	2	1530	40,000	36·5	5 4·7-in. 1 3-in. A.A. 2 2-pr. A.A. 1 M., 4 L.	2 T* 21"	182	500
Douglas		1918											
Campbell		1918											
Mackay, *ex*-Claverhouse		1919											
Malcolm..		1919											
Montrose	Hawthorn Leslie	1918											

1 Flotilla leader (1933 programme) is authorised for commencement, by contract, in 1934.

* Torpedo tubes are removed in Stuart.

DESTROYERS.

Name or Number.	Built by.	Completed.	Dimensions. Length (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Standard Displacement	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).	Fuel Capacity. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Fearless, Eclipse, Defender, Crusader, Beagle, and Acasta Classes:													
Fearless ..	Cammell Laird	Bldg. (est. 1935)	..	..	..	..	..	..	..	..	..	..	..
Foresight ..													
Foxhound ..	Brown												
Fortune .													
Forester ..	J. S. White												
Fury . ..													
Fame ..	Parsons/Vickers-Armstrong												
Firedrake ..													
Eclipse	Denny ..	Bldg. (est. 1934)	..	..	..	..	..	..	..	..	..	..	..
Echo													
Escapade ..	Scotts ..												
Escort ..													
Electra ..	Hawthorn Leslie												
Encounter ..													
Esk	Swan Hunter												
Express ..													
Defender ..	Vickers-Armstrong	1932—1933	317¾ (b.p.)	33	8½	..	1375	36,000	35½	4 4·7-in. 1 3-in. A.A. 7 smaller	8 21"	..	470
Diamond ..													
Daring ..	Thornycroft												
Decoy ..													
Dainty ..	Fairfield ..												
Delight ..													
Diana ..	Palmers ..												
Duchess ..													
Crusader ..	Portsmouth Dockyard	1932	317¾ (b.p.)	33	8½	..	1375	36,000	35½	4 4.7-in. 1 3-in. A.A. 2 2-pr., 1 M., 4 L.	8 21"	..	470
Comet ..													
Cygnet ..	Vickers-Armstrong												
Crescent ..													

Torpedo tubes: D. = double. T. = triple. Q. = quadruple.

Great Britain—*continued.*

Name or Number.	Built by.	Completed.	Dimensions. Length (extreme).	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Standard Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).	Fuel Capacity. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
DESTROYERS—													
Basilisk	Brown ..												
Beagle	,, ..												
Blanche	Hawthorn, Leslie												
Boadicea	,, ,,												
Boreas	Palmers ..	1931	323	32¼	8½	2	1350	34,000	35	4 4·7-in., 2 2-pr. 1 M., 4 L.	2 Q 21"	140	390
Brazen	,, ..												
Brilliant	Swan, Hunter												
Bulldog	,, ,,												
Acasta	Brown ..	1930											
Achates	Brown ..	1930											
Acheron	Thornycroft	1931											
Active	Hawthorn Leslie	1930											
Antelope	Hawthorn Leslie	1930	323	32¼	8¼	2	1350	34,000	35	4 4·7 in., 2 2-pr., 1 M., 4 L.	2 Q. 21"	140	390
Anthony	Scotts ..	1930											
Ardent	Scotts ..	1930											
Arrow	Vickers-Armstr.	1930											
Thornycroft Type:													
Amazon	Thornycroft ..	1927	323	31½	9	2	1350	39,500	37	4 4·7-in., 2 2-pr. 1 M., 4 L.	2 T.	140	483
Yarrow Type:											2 T.	140	385
Ambuscade.. ..	Yarrow	1927	322	31	8¼	2	1170	33,000	37				
Admiralty "S" Class:													
Sabre..	Stephen	1918											
Shamrock	Doxford	1919											
Saladin	Stephen	1919											
Sardonyx	,, ...	1919											
Scimitar	Brown	1918											
Seafire	,, ...	1918											
Searcher	,, ...	1918											
Seraph	,, ...	1918											
Serapis	,, ...	1919											
Serene	,, ...	1919											
Sesame	,, ...	1919											
Sirdar	Fairfield	1918											
Steadfast	Palmer	1919											
Spindrift	Fairfield	1919											
Turbulent	Haw. Leslie ..	1919	276	26⅔	10⅚	2	905	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Tenedos	,, ...	1919											
Thanet	,, ...	1919											
Thracian	,, ...	1922											
Stronghold	Scott	1919											
Sturdy	,, ...	1919											
Sportive	Swan Hunter ..	1918											
Swallow	Scott	1918											
Trojan	J. S. White ..	1918											
Trusty	,, ,, ..	1919											
Senator	Denny	1918											
Scout	Brown	1918											
Scotsman	,, ...	1918											
Shikari	Doxford Chatham ..	1924											
Admiralty "V" Class:													
Vansittart	Beardmore ..	1919											367
Venomous	Brown	1919											353
Verity	,, ...	1919	312	29½	10⅚	2	1120	27,000	34				363
Volunteer	Denny	1919											370
Veteran	Brown	1919											363
Wanderer	Fairfield	1919								4 4·7 in., 2 2-pr., 1 M., 4 L.			367
Wren	Yarrow	1923									2 T.	130	370
Whitshed	Swan Hunter ..	1919											368
Wild Swan	,, ,, ..	1919											365
Witherington ..	J. S. White ..	1919											365
Wivern	,, ,, ..	1919	312	29½	10⅚	2	1120	27,000	34				365
Wolverine	,, ,, ..	1920											365
Worcester	,, ,, ..	1922											366
Whitehall	Swan Hunter Chatham ..	1925											365
Walpole	Doxford	1918											
Whitley	,, ...	1918											
Wryneck	Palmer	1918	312	29½	10⅔	2	1100	27,000	34				367
Windsor	Scott	1918								4 4in., 1 2-pr., 1 M., 4 L.	2 T.	120	
Wrestler	Swan Hunter ..	1918											
Wessex	Haw. Leslie ..	1918											369
Winchester	J. S. White ..	1918	312	29½	10·7	2	1100	27,000	34				369
Wolfhound	Fairfield ..	1918											369

Great Britain—*continued.*

Name or Number.	Built by.	Completed.	Dimensions. Length. (Extreme)	Beam.	Draught.	Number of Screws.	Standards Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes	Complement (War).	Fuel. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Admiralty "V" Class—contd													
Westminster ..	Scott ..	1918											
Westcott ..	Denny ..	1918											
Wakeful ..	Brown ..	1917											
Walker ..	Denny ..	1918											
Walrus ..	Fairfield	1918	312	29½	10·7	2	1100	27,000	34				
Warwick ..	Haw. Leslie ..	1918											
Watchman ..	Brown ..	1918								4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120	367
Whirlwind ..	Swan, Hunter ..	1918											
Winchelsea ..	J. S. White ..	1918											
Vanessa ..	Beardmore ..	1918											
Vanity ..	,, ..	1918											
Vidette ..	Stephen	1918											
Vivien ..	Yarrow ..	1918											
Valentine ..	C. Laird ..	1917								4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120	369
Valkyrie ..	Denny ..	1917											
Valorous ..	,, ..	1917											
Vimy (*late* Vancouver)	Beardmore ..	1918								4 4-in., 1 2-pr., 1 M., 4 L.	1 T. 1 D.		
Vanoc ..	Brown ..	1917								4 4-in., 1 2-pr., 1 M., 4 L.	3		
Vanquisher ..	,, ..	1917											
Vectis ..	J. S. White ..	1917	312	29½	10⅝	2	1090	27,000	34		2 T.		
Vega ..	Doxford ..	1917											
Velox ..	,, ..	1918									1 T., 1 D.		
Venetia ..	Fairfield ..	1917								4 4-in.,			370
Venturous ..	Denny ..	1917								1 2-pr.,	2 T.		
Verdun ..	Haw. Leslie ..	1917								1 M., 4 L.			
Versatile ..	,, ..	1918	..	..	..	..	..	..	..		1 T., 1 D.	120	
Vesper ..	Stephen ..	1918											
Vimiera ..	Swan Hunter ..	1917								4 4-in.,	2 T.		
Violent ..	,, ,, ...	1917								1 2-pr.,			
Vivacious ..	Yarrow ..	1917								1 M., 4 L.	1 T.		
Vortigern ..	J. S. White ..	1918									1 D.		
Thorneycroft "V" Class:													
Witch ..	Thornycroft Devonport	1925	312	30⅝	10·9	2	1140	30,000	35	4 4·7 in., 2 2-pr., 1 M., 4 L.	2 T.	130	365
Wishart ..	Thornycroft ..	1920											374
Woolston ..	,,												
Wolsey ..	,,	1918	312	30⅝	10¼	2	1140	30,000	35	4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120	374
Viceroy ..	,,												374
Viscount ..	,,												
Admiralty "R" Class:													
Tempest ..	Fairfield ..	1917											
Tetrarch ..	H. & Wolff ..	1917											
Thisbe ..	Haw. Leslie ..	1917											
Thruster ..	,, ..	1917											
Torrid ..	Swan Hunter ..	1917	276–276¼	26¾	10⅔	2	900	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D. 21″ (Restless has 1 D.)	98	296–298
Skate ..	Brown ..	1917											
Rowena ..	,, ..	1916											
Restless ..	,, ..	1916											
Sable ..	H. & Wolff ..	1916											
Yarrow "R" Class:													
Tyrant ..	Yarrow ..	1917	271½	25¾	9½	2	760	23,000	36	3 4-in., 1 2-pr. 1 M., 4 L.	2 D. 21″	98	256

8 Destroyers, 1933 programme, are authorised for commencement, by contract, in 1934.

Great Britain—*continued.*

Submarines.

Name or Number.	Where Built.	Completed.	Dimensions. Length. (Extreme)	Beam.	Draught	No. of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes	Complement (War).	Fuel Capacity Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Thames Class:													
Thames ..	Vickers-Armstrong	1932	325	28	14·3	..	1,805/2,680	10,000/2,500	21¾/10	1 4·7-in., 2 smaller	6	..	224
Severn ..	Vickers-Armstrong	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Clyde													
Porpoise Class:†													
Porpoise ..	Vickers-Armstrong	1933	267 b.p.	29·8	13·8	..	1500	3,300/—	15/—	1 4·7 in.	..	..	155
Swordfish Class:													
Starfish ..	Chatham ..	1933	187 b.p.	24	10·5	..	640/935	1,550/1,300	13¾/10	1 3-in. A.A., 2 smaller	6	..	44
Seahorse ..													
Swordfish ..													
Sturgeon ..													
Sealion ..	Cammell Laird	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Salmon ..													
Shark	Chatham ..												
Snapper § ..													
Rainbow Class:													
Rainbow ..	Chatham ..	1932	290	29·8	13·8	..	1,475/2,015	4,400/1,320	17½/9	1 4-in. (Perseus has 1 4·7 in.)	8	55	156
Regent ..	Vickers-Armstrong	1930											
Regulus ..		1930											
Rover .		1931											
Parthian Class:													
Parthian ..	Chatham ..	1931	290	29·8	13·7	..	1,475/2,040						
Perseus ..	Vickers-Armstrong ..	1930											
Proteus ..													
Pandora ..													
Phœnix ..	Cammell Laird	1931											
Odin Class:													
Odin	Chatham ..	1929	283½	29·8	14·3	..	1,475/2,030	4,400/1,320	17½/9	1 4-in., 2 Lewis	8	53	174
Olympus ..	Beardmore ..	1930											
Orpheus ..	Beardmore ..	1930											
Osiris	Vickers ..	1929											
Oswald ..	Vickers ..												
Otus	Vickers ..												
Oberon Class:													
Oberon ..	Chatham ..	1927	270	28	13·5	..	1,311/1,805	2,950/1,350	15/9	1 4-in., 2 Lewis	8	52	200
Oxley* ..	Vickers ..	1927	275	27·7	13·3	..	1,350/1,835	3,000/1,359	15½/9	1 4-in., 2 Lewis	8	52	200
Otway* ..													
X Type:													
X1	Chatham ..	1925	363½	29·8	15·7	..	2,425/3,600	6,000/2,600	19½/9	4 5·2 in., 2 Lewis	6	100	450
R Class:													
R4	Chatham ..	1919	163	15·5	11·6	..	385/500	240/1,200	9½/15	1 Lewis	6	23	23
L 50 Class:													
L71	Scott's ..	1920	235	23·5	13·2	..	845/1,150	2,400/1,600	17½/10½	1 4-in., 1 Lewis	6	44	110
L69 .. .	Beardmore ..	1923											
L56 .. .	Fairfield ..	1919								1 4-in., 1 Lewis			
L54	Denny ..	1924											
L53	Armstrong ..	1925											
L52	Armstrong ..	1921								2 4-in., 1 Lewis			
L Class: ‡													
L27	Vickers ..	1926	238½	23½	11·7	..	760/1,080	2,400/1,600	17½/10½	1 4-in., 1 Lewis (L25, L17, and L14 have 1 Lewis, 16 mines)	4	41	76
L26	Vickers ..	1926											
L25	Vickers ..	1920											
L23	Vickers ..	1924											
L22	Vickers ..	1921											
L21	Vickers ..	1920											
L20	Vickers ..	1919											
L19	Vickers ..	1919											
L18	Vickers ..	1919											
L14	Vickers ..	1918											

* Transferred from the Royal Australian Navy in 1931. † Minelaying submarines.
‡ L16 and L17 are paid off into dockyard control for disposal. § The Snapper was brought forward from the 1933 programme in place of Grampus, which was to have been laid down at Chatham in 1933, under the 1932 programme.

Great Britain—*continued.*

Submarines—*continued.*

Name or Number.	Where Built.	Completed.	Dimensions. Length. (Extreme)	Dimensions. Beam.	Dimensions. Draught.	No. of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement (War).	Fuel Capacity. Oil.
			Feet.	Feet	Feet.		Tons.		Knots.				Tons.
H Class:													
H50	Beardmore ..	1920											
H49	Beardmore ..	1919											
H48	Beardmore ..	1919											
H44	Armstrong ..	1920											
H43	Armstrong ..	1919											
H34	Cammell Laird	1919											
H33	Cammell Laird	1919	171	15·75	13	..	410 / 500	480 / 320	13 / 10½	1 Lewis	4	23	16
H32	Vickers ..	1919											
H31	Vickers ..	1919											
H30	Vickers ..	1918											
H28	Vickers ..	1918											
H27	Vickers ..	1918											
H24	Vickers ..	1918											
H23	Vickers ..	1918											

3 submarines, 1933 programme, are authorised for commencement in 1934 (1 at Chatham dockyard and 2 by contract).

Sloops

Name.	Displacement.	Length (extreme).	Beam (extreme).	Draught.	Horse-Power.	Where built.	Maker of Machinery.	Date of Launch.	Date of Completion.	Armament.	Speed (knots).	Coal. / Oil.	Complement.
		ft. ins.	ft. ins.	ft. ins.									
Sloops.													
Convoy Sloop: *													
Bittern .	..	..	..	..	..	J. Brown	J. Brown	..	Bldg.	..	..	..	..
Grimsby Class:													
Grimsby .													
Leith .	1060 †	..	..	..	..	Devonport	J. S White	..	Bldg. est. 1934	4 7-*in.* guns.	..	..	..
Halycon Class:													
Halycon .	..	..	..	..	..	J. Brown	J. Brown	..	Bldg. est. 1934				
Skipjack .	..	..	..	..	..					..	..	..	..
Harrier .	..	..	..	..	..	Thornycroft	Thornycroft	..					
Hussar .	..	..	..	..	..								
Repeat Shoreham Class:													
Lowestoft .	..	..	..	..	..	Devonport		..	Bldg.	..	..	..	..
Wellington	..	..	..	..	..								
Falmouth .						Devonport	Hawthorn Leslie		1932				
Milford .							Yarrow						
Weston .	1105 †	281 4	35 0	8 3	2,000 P.T. (G.)		Yarrow	1932		1 4-*in.*, 1 4-*in.* A.A. 4 3-*pr.* 8 L.	16–16½	— / 290	..
Dundee .						Chatham	Hawthorn Leslie		1933				

* 1933 Programme. † Estimated displacement.

Great Britain—*continued.*

Sloops.—*continued.*

Name.	Displacement.	Length (extreme).	Beam (extreme).	Draught.	Horse-Power.	Where Built.	Maker of Machinery.	Date of Launch.	Date of Completion.	Armament.	Speed (knots).	Coal. / Oil.	Complement.
		ft. ins.	ft. ins.	ft. ins.									
Shoreham Class:													
Bideford						Devonport	J. S. White & Devonport	1931	1931				
Rochester						Chatham	J. S. White & Chatham	1932	1932				
Fowey	1105*	281 4	35 0	8 0	2,000 P.T. (G.)	Devonport	J. S. White & Devonport	1930	1931	1 4-in., 1 4-in. A.A. 4 3-pr. 8 L.	16–16½	— / 290	..
Shoreham						Chatham	J. S. White & Chatham	1930	1931				
Hastings Class:													
Hastings	1025					Devonport	Devonport	1930	1931				
Penzance						Devonport	Devonport	1930	1931				
Folkestone	1045	266 4	34 1	9 1	2,000 P.T. (G.)	Swan, Hunter	Hawthorn, Leslie	1930	1930	1 4-in., 1 4-in. A.A. 2 3-pr. 8 L.	16–16½	— / 280	
Scarborough						Swan, Hunter	Hawthorn, Leslie	1930	1930				
Bridgewater Class:													
Bridgewater	1045	266 4	34 0	8 6	2,000 P.T. (G.)	Hawthorn Leslie	Hawthorn Leslie	1928	1929	1 4-in., 1 4-in. A.A., 4 L.	16–16½	— / 275	95
Sandwich													
Anchusa Class:													
Harebell‡	1345	274 9	35 0	12 0	2,500 recip.	Barclay Curle	Barclay Curle	1918	1918	2 4-in. 2 12-pr., 2 L.	16·5	320 / —	119
Chrysanthemum	1345	276 0	35 0	13 3	2,500 recip.	Armstrong	Wallsend Slipway	1917	1918	2 3-pr.	16·5	260 / —	100
Bryony	1345	275 3	35 0	12 10	2,500 recip.	Armstrong	Wallsend Slipway	1917	1917	1 M., 8 L.	16·5	260 / —	70
Arabis Class:													
Cornflower						Barclay Curle	Barclay Curle	1916	1916	2 4-in., 4 3-pr. A.A., 2 M., 8 L.	16·5	255 / —	100
Godetia‡						C. Connell	Rowan	1916	1916	1 4-in., 1 12-pr. 2 L.		255 / —	
Lupin†	1175	267 9	33 6	12 0	2,000 recip.	Simons	Simons	1916	1916	2 4-in., 4 3-pr., 1 2-pr., 8 L.	16–17	— / 182	100
Rosemary						Richardson Duck	Blair	1915	1916	1 4-in., 2 2-pr. 2 M., 8 L.		260 / —	
Snapdragon§						Ropner	Blair	1915	1916	2 4-in., 4 3-pr. 2 2-pr., 8 L.	16–17	255 / —	100
Azalea Class:													
Heliotrope	1163	262 6	33 0	12 3	1,800 recip.	Lobnitz	Lobnitz	1915	1915	4 3-pr. 1 4-in., 2 2-pr., 2 M., 8 L.	16–17	250 / —	100
Acacia Class:													
Daffodil						Scott's	Scott's						
Laburnum						Connell	Rowan						
Veronica	1165	262 6	33 0	12 6	1,800 recip.	Dunlop Bremner	Dunlop Bremner	1915	1915	2 4-in., 4 3-pr. 2 2-pr., 8 L. (Daffodil and Foxglove 2 M.)	16–17	250 / —	100
Foxglove													

* Estimated displacement. † Converted to oil-burning. ‡ Fishery protection ships.
§ Equipped for Fleet target duties.

5 sloops, 1933 programme, are authorised for commencement in 1934 (one sloop each to be built by Devonport and Chatham Dockyards, one minesweeping sloop and one coastal sloop to be built by contract).

Great Britain—*continued.*

TWIN-SCREW MINESWEEPERS, RIVER GUNBOATS.

Name.	Displacement.	Length (extreme).	Beam (extreme).	Draught.	Horse-Power.	Where built.	Maker of Machinery.	Date of Launch.	Date of Completion.	Armament.	Speed (knots).	Coal. / Oil.	Complement.
TWIN-SCREW MINE-SWEEPERS.													
Aberdare						Ailsa	Ailsa	1918	1918				
Abingdon						Ailsa	G. Clark						
Albury						Ailsa	Ailsa	1918	1919				
Alresford						Ailsa	W. H. Allen	1919	1919				
Bagshot						Ardrossan Dry Dock Co.	W. H. Allen	1918	1919				
Derby						Clyde S.B. Co.	Clyde S.B. Co.	1918	1918				
Dundalk						Do.	Do.						
Dunoon						Do.	Do.						
Fermoy						Dundee S.B. Co.	Cooper & Greig	1919	1919				
Fareham						Dunlop, Bremner	Dunlop, Bremner	1918	1918				
Forres						Clyde S.B.Co	G. Clark	1918	1919				
Tiverton						Simons	Simons	1918	1918				
Elgin						Do.	Do.						
Caterham	710	231 0	28 7	9 0	2,200 recip.	Bow, McLachlan	Bow, McLachlan	1919	1919	1 4-*in.*, 1 12-*pr.* A.A. (except Forres no armament)	16	186 / —	73
Carstairs						Do.	Do.						
Sutton						McMillan	Yarrow						
Saltash						Murdock & Murray	Do.	1918	1918				
Saltburn						Do.	Do.						
Selkirk						Do.	D. Rowan	1918	1919				
Ross						Do.	Do.	1919	1919				
Widnes						Napier & Miller	Rowan						
Harrow						Eltringham	Wallsend Slipway	1918	1918				
Huntley						Do.	Eltringham	1919	1919				
Lydd						Fairfield	Fairfield	1918	1919				
Stoke						C. Rennoldson	Shields Eng. Co.	1918	1918				
Pangbourne						Lobnitz	Lobnitz						
Tedworth	675	231 0	28 0	9 0	1,800 recip.	Simons	Simons	1917	1917	1 3-*in.* A.A.	14	140 / —	35
RIVER GUN-BOATS.													
Robin	226	150 b.p.	26 8	3 0	800 recip.	Yarrow	Yarrow	1934	Bldg.	1 3·7-*in.* Howitzer, 1 6-*pr.*, 8 L.	12¾	— / 140	
Sandpiper	185	160 0 b.p.	30 8	1 10	600 recip.	Thornycroft	Thornycroft	1933	1933	1 3·7-*in.* Howitzer, 1 6-*pr.*, 8 L.	11½	— / 28	
Falcon	372	150 0	28 8	4 9	2,250 (G.)	Yarrow	Yarrow	1931	1931	1 3·7-*in.* Howitzer, 2 6-*pr.*, 8 L.	15	— / 84	
Gannet	310	185 0	29 0	4 0	2,250 (G.)	Yarrow	Yarrow	1927	1928	2 3-*in.* A.A., 8 L.	16	— / 60	60
Peterel								1927	1927				
Seamew	262	168 0	27 0	4 0	1,370 (G.)	Do.	Do.	1928	1928		14	— / 50	60
Tern								1927	1927				
Aphis						Ailsa	Ailsa	1915	1915	2 6-*in.*, 1 3-*in.* A.A., 1 2-*pr.*, 8 L.		— / 100	
Bee						Do.	Do.	1915	1916	1 3-*in.* A.A., 2 3-*pr.*, 1 2-*pr.*, 8 L.			
Cicala						Barclay Curle	Barclay Curle	1915	1916	2 6-*in.*, 1 3-*in.* A.A., 1 2-*pr.*, 8 L.		35 / 55	
Cockchafer						Do.	Do.	1915	1916	2 6-*in.*, 1 3-*in.* A.A., 8 L.			
Cricket						Do.	Do.	1915	1916	2 6-*in.*, 1 3-*in.* A.A., 1 2-*pr.*, 8 L.			
Gnat	625	237 6	36 0	4 6	2,000 recip.	Lobnitz	Lobnitz	1915	1915		14	— / 100	55
Ladybird						Do.	Do.	1915	1916	2 6-*in.*, 1 3-*in.* AA., 1 2-*pr.*, 8 L.			
Mantis						Sunderland S.B. Co.	N.E. Marine	1915	1915	2 6-*in.*, 1 3-*in.* A.A., 1 2-*pr.*, 8 L.		35 / 55	
Moth						Do.	Do.	1915	1916	2 6-*in.*, 1 3-*in.* A.A., 1 2-*pr.*, 8 L.		— / 80	
Scarab						Wood, Skinner	Do.	1915	1915			— / 105	
Tarantula						Do.	Do.	1915	1916	1 6-*in.*, 1 3-*in.* A.A., 1 2-*pr.* 8 L.		— / 105	
Moorhen*	180	165 0	24 6	2 3	670 recip.	Yarrow	Yarrow	1901	1901	2 6-*pr.*, 8 L.	13	35 / —	34

* **Paid off into Dockyard control at Hong-Kong, 1933.**

Argentine Republic.

Name or Number.	Where Built.	Launched	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FLOTILLA LEADERS—													
Cervantes (*ex*-Spanish Churruca) Juan de Garay (*ex*-Spanish Alcala Galiano)	Cartagena ..	1925	331¾	31¾	10½	2	1650	42,000	36	5 4·7 in., 1 3-in. A.A., 4 M.	2 triple 21-in.	—	— / 540
Mendoza .. La Rioja .. Tucuman ..	J. S. White, Cowes	1928 1929 1929	335	31·8	12¼	2	1520	45,000	36 (La Rioja 39·4 *t.*)	5 4·7 in., 1 3-in. A.A., 2 2-pr., 4 M.	2 triple 21-in.	160	— / 700
DESTROYERS—													
Catamarca * .. .. Jujuy †	Schichau .. Germania ..	1911	288·7	27	10	2	972	18,000	32	3 4-in. 2 1-pr.	4 21-in.	100	—
Cordoba * .. .. La Plata †	Shichau .. Germania ..	1910 1911	295	29·5	10	..	1000	28,000	34·7 *t.*			100	—
SUBMARINES—													
Santa Fe .. .. Salta .. .. .. Santiago del Estero	Taranto ..	1931 1932 1933	221½	21½	13	2	850 / 1080	3,000 / 1,300	17·5 / 9	1 4-in. 1 2-pr. A.A.	8 21-in.	—	—

* Converted to oil-burning, 1927, at Buenos Aires. † Converted to oil-burning at Buenos Aires.
3 flotilla leaders and 3 submarines are projected.

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Para .. .. Piahuy .. .. .. Matto Grosso .. .. Parahyba.. .. .. Rio Grande del Norte Alagoas .. .. .. Santa Catharina .. Parana .. .. .. Sergipe	* Yarrow ..	1908 1908 1908 1909 1909 1909 1909 1910 1909	240 p.p.	23·6	7·5	2	560	8,000	27 (27·1–28·7 on trials)	2 4-in., 4 3 prs.	2 18-in.	75	140 / —
Maranhao (*ex*-Porpoise)	Thornycroft..	1913	265·3	26·5	10	..	934	22,500	31	3 4-in., 1 2-pr.	2 dble. 21-in.	..	— / 250
SUBMARINES—													
Humayta	Spezia (Ansaldo Fiat)	1927	282	25·6	14	2	1450 / 1884	4,800 / 2,200	18·5 / 10	1 4-in. A.A.; carries mines	6 21-in.	55	— / 140
F 1 .. .. F 3 .. .. F 5	Spezia (Fiat)	1913	150	13·8	12	..	250 / 370	700 / 500	13·5 / 8	—	2 18-in.	..	..

* In bad condition.

Chile.

Name or Number.	Where Built.	Launched.	Dimensions. Length (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Destroyers—													
Serrano .. .. / Orella .. .. .. / Riquelme .. .. / Hyatt .. .. .. / Videla .. .. .. / Aldea	Thornycroft's	1928	300	29	9	2	1090	28,000	35	3 4·7-in., 1 3-in.	2 triple 21-in.	130	— / 340
Almirante Lynch, / Almirante Condell	White.. ..	1912 / 1913	320 p.p.	32·6	11·1	3	1850	30,000	31	6 4-in. 4 M.	4 18-in.	190	427 / 80
Almirante Riveros (ex-Faulknor) .. / Almirante Uribe (ex-Broke) .. / Almirante Williams (ex-Botha)	White ..	1914	320 p.p.	32·6	11	3	1700 to 1740	30,000	31 / 31·5	3 4·7-in., 2 4-in., or 2 2-pdr. A.A.	4 21-in.	174	403 / 83
Submarines—													
Capitan Thompson .. / Capitan Simpson .. / Capitan O'Brien ..	Vickers Armstrong's	1929 / 1929 / 1928	275	27·5	14·8	..	1520 / 1990	..	15 / 9	1 4-in.	8 21-in.	..	..
H 1 .. / H 2 .. / H 3 .. / H 4 .. / H 5 .. / H 6 ..	Fore River, U.S.A.	1915	150·3	15·75	12·3	..	355 / 470	480 / 640	13 / 11	..	4 18-in.	22	— / 17·5

3 submarines are projected (no money voted).

Denmark.

Name or Number.	Where built.	Launched.	Dimensions. Length (Extreme).	Beam.	Draught.	Number of Screws.	Displacement.	Horse Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Torpedo Boats. First Class—													
Glentin .. .. / Hogen .. .. .. / Ornen	Royal Dockyard, Copenhagen	1933	198·9	19·5	..	..	285	6,000	28	2 3·4-in.	6 17·7 in.	46	— / 40
Laxen .. .. / Dragen .. .. / Hvalen	Royal Dockyard, Copenhagen	1930 / 1929 / 1930	198·9	19·5	7·4	2	281	6,000	28	2 3-in.	8 17·7 in.	46	— / 26
R4. Havkatten † / R5. Sælen † .. / R3. Nordkaperen † / R2. Makrelen † .. / S6. Narhvalen * .. / S5. Havhesten * .. / S4. Söhunden * .. / S3. Sölöven * / S2. Stören * .. / S1. Springeren * ..	Royal Dockyard, Copenhagen	1919 / 1919 / 1918 / 1918 / 1917 / 1917 / 1917 / 1916 / 1916	126·3	13·9	9	2	96	2,000	24·6 t.	2 6-pr. A.A.	2 (1 in R2-4)	22	15 / —
P1. Hvalrossen †	Royal Dockyard, Copenhagen	1913	148·2	16·9	7·5	2	158	3,480	26·2 t.	1 3-in.	4 18″	30	28 / —
O3. Söülven .. / O2. Flyvefisken / O1. Söridderen ..	Burmeister, Copenhagen / Yarrow & Co.	1911 / 1911 / 1911	181·7	18	9·7	2	222	5,000	27·5	2 3-in.	5 18″	33	80 / —
N3. Spaekhuggeren / N2. Vindhunden / N1. Tumleren ..	Royal Dock., Copenhagen / Schichau	1911	184·8	19·1	7·1	2	247	5,000	27·5	2 3-in.	5 18″	34	80 / —
Submarines—													
Daphne. D1 .. / Dryaden. D2 ..	Royal Dockyard, Copenhagen	1926	161	16	8·2	..	305 / 370	900 / 400	13·4 / 7	1 3-in. A.A.	6 18″	18	— / 16
Flora. C3 .. / Bellona. C2 ..	,,	1919	155·7	14·4	3·8	..	301 / 369	900 / 640	14·5 / 10·5	1 6-pr.	5 18″	17	— / 13
Rota. C1 .. / Galathea. B12 .. / Neptun. B11 .. / Triton. B10 .. / Ran. B9 .. .. / Aegir. B8	,,	.. / .. / .. / 1914 / 1915 / 1914	133·3	12·3	8	..	181 / 231	450 / 340	13·5 / 9·8	1 6-pr	3 18″	12	— / 9

* Used as minesweepers. † Used as patrol vessels.

France.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
FLOTILLA LEADERS—			Feet.	Feet.	Feet		Tons.		Knots.				Tons.
Mogador	Lorient..	Bldg.	..	..	..	..	2,569	..	..	..	..	..	..
Le Fantasque	Lorient..	Bldg.	426	36	14						9	220	..
L'Audacieux											9		
Le Malin	Ch. de la Mediterranée	1933				..	2,569	74,000	37	5 5·5-in., 4 1-pr. A.A.	21·7 in.	..	..
L'Indomptable													
Le Triomphant	Ch. de France	Bldg.	423	39	14								
Le Terrible													
Vauquelin	Ch. de France, Dunkirk	1932											
Kersaint	Ch. de la Loire, Nantes	1931											
Cassard	Ch. de Bretagne, Nantes	1932											
Tartu	Ch. de la Loire, Nantes	1931	423	38½	14	2	2,441	74,000	37	5 5·5-in, 4 1-pr. A.A.	7 21·7 in.	220	..
Maillié Brézé	Ch. de Penhoet, St. Nazaire	1931											
Le Chevalier-Paul	Ch. de la Mediterranée, Havre	1932											
Aigle	Ch. de France, Dunkirk												
Vautour	Ch. de la Mediterranée, Havre												
Albatros	Ch. de la Loire, St. Nazaire	1930	426	38	14	2	2,441	74,000	37	5 5·5-in., 4 1-pr. A.A.	6 21·7 in.	220	..
Gerfaut	Ch. de Bretagne, Nantes												
Milan	Lorient ..	1930	426	38	14	2	2,441	75,000	37	5 5·5-in., 4 1-pr. A.A.	7 21·7 in.	220	..
Epervier													
Valmy	Ch. de Penhoet, St. Nazaire	1928											
Verdun	Ch. de la Loire, St. Nazaire	1928											
Vauban	Ch de France Dunkirk	1930	427	37¾	15	2	2,436	70,000	36	5 5·5-in. 4 1-pr. A.A.	6 21·7 in.	216	— / 650
Lion	Dunkirk ..	1929											
Bison	Lorient ..	1928											
Guépard	Lorient ..	1928											
Chacal	St. Nazaire..	1924											
Jaguar	Lorient Dy.	1923											
Leopard	St. Nazaire..	1924	416	36	14·8	2	2,126	50,000	35·5	5 5·1-in., 2 3-in. A.A.	6 21·7 in.	206	— / 530
Lynx	,,	1925											
Panthère	Lorient Dy.	1924											
Tigre	Nantes ..	1924											
Amiral Sénès, *ex*-German S. 113	Germany ..	1917	346·5	33·5	14·8	2	1,526	44,000	34	4 5·9-in., 2 1-pr.	2 D.	180	— / 700
DESTROYERS—													
Le Hardi	..	Bldg.	.	..	..	..	1,378	..	..	4 5·1-in.	..	..	..
Forbin	Ch. de Graville, Le Havre	1928											
Frondeur	Ch. Navals Français, Caen	1929											
Fougueux	Ch. de Bretagne, Nantes	1928											
Foudroyant	Ch. de Dyle et Bacalon, Bordeaux	1929											
Basque	Maritime ..	1929	351·7	32·2	10·2	..	1,378	35,000	34	4 5·1-in., 2 1-pr. A.A.	6 21·7 in.	146	— / 300
Bordelais	Bordeaux ..	1928											
Boulonnais	Caen ..	1927											
Brestois	Nantes ..	1927											
L'Adroit	Dunkirk ..	1927											
L'Alcyon	Bordeaux ..												
Le Fortune	Caen ..												
Le Mars	Caen ..	1926											
La Palme	Nantes ..												
La Railleuse	Nantes ..												
Bourrasque	Dunkerque	1925											
Cyclone	Havre ..	1925											
Mistral													
Orage	Caen ..	1924											
Ouragon													
Simoun	St. Nazaire..	1924	346¼	31·7	10·2	2	1,319	33,000	33	4 5·1-in., 1 3-in. A.A.	6 21·7 in.	140	— / 350
Sirocco	Rouen.. ..												
Tempête	Nantes ..	1925											
Tramontane	Bordeaux ..	1924											
Trombe	Harfleur ..												
Typhon	Bordeaux ..	1925											
Tornade	Barcelona ..	1925											

France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS—*Contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Ens. Roux, M. P. Lestin	Rochefort ..	1916	271	27	10·5	2	787	18,000	30	2 3·9-in., 1 3-in., 4 9 pr.	4 18-in.	98	— / 206
Ens. Gabolde	Havre	1921	271	26·9	10·0	2	802	22,000	33	3 3·9-in., 1 3-in. A.A.	4 21·7-in.	98	— / 200
Deligny, *ex*-S. 139 .. Chastang, *ex*-S. 133 .. Vesco, *ex*-S. 134 .. Mazare, *ex*-S. 135 ..	Germany ..	1917	272·3	27	11·5	2	767	16,800	28	3 4·1-in., 4 M.	6 19·7-in.	113	— / 246
Matelot Leblanc, *ex*-Austrian, Dukla ..	Fiume ..	1916	277·5	25·7	11·0	2	748	18,000	30·5	2 3·9-in., 6 9-pr.	4 21-in.	120	168 / 152
Téméraire,* Intrépide,* Opiniâtre, Aventurier*	Nantes ..	1911	290·5	28·5	11·5	..	915	24,000	27	4 3·9-in. 1 3-pr. A.A.	4 18-in.	102	236 / 74
Annamite, Algérien, Arabe, Bambara, Hova, Kabyle, Marocain, Sakalave, Sénégalais, Somali, Tonkinois, Touareg ..	Japan	1917	272	24	10·5	..	601	11,000	29	1 4·7-in., 3 3-in. 1 3-in. A.A.	2 dbl. 18-in.	106	98 / 115

1st class torpedo boats (1905–7), Nos. 315, 321, 349, 369, 85 tons, 2000 H.P., 26 knots, 1 3-in. gun, 1–3 torpedo tubes.
* Converted to oil-burning.

Name or Number.	Where Built.	Launched.	Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surf. / Sub.	Horse-Power. Surf. / Sub.	Speed. Surf. / Sub.	Armament.	Torpedo Tubes.	Complement.	Fuel.
CRUISER SUBMARINES—													
Surcouf..	Cherbourg ..	1929	393·7	29·5	23	2	2880 / 4300	7600 / 3400	18 / 11	2 8-in. 2 1-pr.	14 21-in	130	..
SUBMARINES—													
Agosta .. Beveziers .. Ouessant .. Sidi-Ferruchi .. Sfax .. Casablanca ..	Cherbourg .. Brest .. Ch. de la Loire.. ..	Bldg.	..	..	..	..	1379 / ..	8000 / ..	17 / ..	1 3·9 in. 1 smaller	11	..	..
Le Glorieux .. Le Centaure .. Le Héros .. Le Conquerant .. Le Tonnant .. L'Espoire ..	Cherbourg .. Cherbourg .. Brest .. Brest .. Loire .. la Seine ..	1931–1932	302·8	26·8	15·5	2	1379 / 1968	6000 / 2000	17 / 10	1 3·9-in. 1 1·5-in. A.A.	11	61	..
Persée .. Protée .. Pégase .. Phénix ..	Ch. Navals Français, Caen Forge et Ch. de la Mediterranée la Seyne Ch. de la Loire, St. Nazaire Ch. Dubigeon, Nantes	1930	301·8	26·8	15·5	2	1379 / 1968	6000 / 2000	18 / 10	1 3·9-in., 1 1·5-in. A.A.	11	61	..
Achille .. Ajax .. Acheron .. Argo .. Acteon ..	Brest .. Ch. de la Loire, St. Nazaire Ch. Dubigeon, Nantes	1929–1930	301·8	26 8	15·5	2	1379 / 1968	6000 / 2000	18 / 10	1 3·9-in, 1 1·5-in. A.A.	11	61	— / 96
Pascal .. Pasteur .. Poncelet .. Henri Poincare .. Archimede .. Fresnel.. Monge ..	Brest .. Lorient .. Caen .. Ch. de Penhoet, St. Nazaire Ch. de la Mediterranée, la Seyne	1928–1929	302·5	26·8	15·5	2	1379 / 1968	6000 / 2000	18 / 10	1 3·9-in. 1 1.5-in. A.A.	11	61	— / 96
*Perle .. *Diamant .. *Rubis .. *Nautilus .. *Saphir .. *Turquoise ..	Toulon	1933 1933 1930 1928 1929 1929	216·5	23·3	13·5	2	669 / 910	1300 / 800-1000	12 / 9	1 3-in., 64 mines	5	40	..
Redoubtable .. Vengeur ..	Cherbourg ..	1928	302·5	30·5	15·5	2	1384 / 1968	6000 / 2000	18 / 10	1 3·9-in. A.A. 1 1-pr. A.A.	11	..	— / 96
Requin .. Morse .. Narval .. Souffleur .. Caiman .. Dauphin .. Espadon .. Marsouin .. Phoque ..	Cherbourg .. Toulon .. Brest ..	1924 1925 1925 1924 1927 1925 1926 1924 1926	278·8	22·5	15	2	974 / 1415	2900 / 1800	16 / 10	1 3·9-in. A.A.	10	54	..

* Minelayer.

France—*continued.*

Number and Name.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surf./Sub.	Horse-Power.	Speed. Surf./Sub.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal/Oil
SUBMARINES—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Minerve Junon Venus Iris	Cherbourg Havre Worms Dubigeon	Bldg.	..	..	..	..	571	..	..	..	..	..	..
Orphée Oréade Orion Ondine Psyche Sybille Vestale Sultane	Ch. Normand, Havre Ch. Normand Worms Schneider	1932 1932 1931 1931 1932	211	15 8	..	..	558-570/787	1300/1000	13·7/9	1 3-in., A. A.	8 21"	..	..
Amphitrite Antiope Atalante Amazone Diane Meduse Argonaute Arethuse	Le Trait Havre Chalons-sur-Saone Le Trait Chantiers Normand, Havre Schneider et Cie Chalons-sur-Saone	1932 1932 1930 1932 1930 1930 1929 1929	216¼	16·2	12·7	2	565-571/787	1300/1000	13·7/9·2	1 3-in. A.A.	8 21"	..	..
Ariane Danaé Eurydice	Havre	1925 1927 1927	216·5	16	12·8	2	576/766	1200/1000	14/9	1 3-in. A.A.	7 21·7"	40	..
Circé Calypso Doris Thetis	Chalons	1925 1926 1927 1927	204·5	17·5	12·8	2	552/765	1250/1000	14/9	1 3-in. A.A.	7 21·7"	40	..
Naïde Sirène Nymphe Galatée	St. Nazaire	1925 1925 1926 1925	210	17	12·8	2	548/744	1300/1000	14/9·5	1 3-in. A.A.	7	39	..
Amphitrite II. Atalante II.	Rochefort Toulon	1914 1913	177	17·7	10·9	2	384-597	1300/700	14·7/8	1 3-in.	8 18"	30	—/13
Néréide	Cherbourg	1914	243	19·8	12·3	2	771-1070	2900/1500	14/12	1 3-in.	8 18"	40	—/56
Bellone, Hermione, Gorgone	Rochefort Toulon	1914 & 1915	198·9	17·7	11·9	2	484-783	1800/800	15·5/10	1-3-in.	8 18"	40	—/14
Gustave Zédé	Cherbourg	1913	243	19·7	12·3	..	771-1080	2400/1500	16/10	1 3-in.	8 18"	47	—/68
Daphne	Cherbourg	1915	223	18·0	12·0	2	647-882	1800/1500	15/11	1 3-in.	10 18"	43	—/58
Joessel, Fulton	Cherbourg	1917	243	20·0	13·4	2	838-1181	2900/1650	17/10½	2 3-in.	8 18"	47	—/118
Laplace Lagrange Romazotti, Regnault	Rochefort Toulon Toulon	1917 1917 1918	246	21·0	13·0	2	838-1307	2600/1640	17/11	2 3-in.	8 18"	47	—/90
Armide (*ex*-Japanese) Amazone II. (*ex*-Greek)	Schneider	1915	184·6	17·0	10	2	420-665	2200/900	15/10	—	6 4 18"	29	—/27
O'Byrne, Henry Fournier,	Chalons	1919	172	15·6	9·6	..	310-507	1020/460	14/8	1 3-pr.	4 18"	24	—/10
Dupuy de Lôme, Sané	Chalons	1916 1915	246	20·9	13·7	..	748-1270	2400/1660	18/11	2 3-in.	8 18"	40	—/99
*Pierre Chailley	Havre	1922	229·7	26·3	13 0	..	798-1181	1800/1400	13·7/9	1 3·9-in., 2 M 40 mines	4 18"	43	—/54
*Maurice Callot	Bordeaux	1921	247·8	22	11·8	..	843-1270	2900/1640	16½/10	1 3-in., 40 mines	6 18"	48	—/44
Pierre Marrast (*ex*-U. 162) Jean Roulier (*ex*-U.166)	"	1918	235	21	12·7	2	744-1030	2400/1200	16/8·5	1 4-in., 1 M.	6 19·7"	48	—/98
Halbronn (*ex*-U. 139)	"	1918	302·2	30	15·5	2	1841-2516	3300/1780	13·6/7·7	2 5·9-in.	6 19·7"	80	—/443
Jean Autric (*ex*-U.105) Leon Mignot (*ex*-U.108)	"	1917	234·5	21	12·5	..	744-1036	2400/1200	16·5/8·5	1 4 1-in., 1 M.	6 19·7"	48	—/81
Jean Corre (*ex*-U.B. 155) Carissan (*ex*-U.B. 99) Trinité Schillemans (*ex*-U.B. 94)	"	1917 1918	182·5	19	12	..	464-640	1100/760	12/7·5	1 4·1-in., 1 M.	5 19·7"	34	—/74
*René Audry (*ex*-U. 119)	"	1917	267·5	24	14	..	1041-1525	2400/1200	14·5/7·2	1 5·9-in., 1 M 42 mines	4 19·7"	54	—/213
*Victor Réveille (*ex*-U. 79)	"	1916	193	19·5	16	..	681-877	1300/800	10/8	1 4·1-in., 1 M. 36 mines	2 18"	40	—/64

French submarines are divided into two classes. 1st class: All vessels of 850 tons and above in the surface condition, including the U minelayers. 2nd class: All smaller vessels.

* Mine-laying submarines.

Germany.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet		Tons.		Knots.				Tons.
DESTROYERS—													
Iltis	Wilhelmshaven	1927	304	28¼	8¾	2	800	23,000	34	3 4·1-in.	6 19·7 in. (T.)	115	— / 300
Wolf		1927											
Tiger		1928											
Luchs													
Jaguar													
Leopard													
Seeadler	Wilhelmshaven	1926	287¾	27¼	9½	2	800	23,000	33	3 4·1-in.	6 19·7 in. (T.)	111	— / 300
Greif		1926											
Albatros		1926											
Kondor		1926											
Falke		1926											
Möwe		1926											
*G. 11	Germania Works, Kiel	1911–1912	233†	25	10	2	650	16,000	32	2 4·1-in., 7 M.	2 19·7 in.	90	140 / 60
*G. 10													
*G. 8													
*G. 7													
TORPEDO BOATS—													
T. 23	Shichau Elbing Kiel	1913	234·6	24·6	10	2	630	15,700	32	2 4·1-in., 7 M.	2 19·7 in.	90	132 / 55
T. 196	Vulcan Works, Stettin	1911	243	26	10·5	2	787	18,000	32	2 4·1-in., 2 M.	2 19·7 in.	98	160 / 54
T. 190		1910											
T. 151, 153, 155–8	..	1907–8	237	25½	10·1	2	664	10,900	30	2 3·9-in.	2 19·7 in.	97	— / 172

Four destroyers are projected; construction to commence in 1934.
Five torpedo boats are projected, construction to commence in 1936.

* Classified as torpedo boats in German official lists.
† Length increased during alterations, 1929–30.

Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Hydra	Odero, Genoa	1931	308·8	30·3	10·5	..	1230	30,000	40	4 4·7 in., 4 2-pr. A.A.	6 21-in. (T.)		
Conduriotis													
Spetsai			308·8	30·3	11·3	..	1308						
Psara													
Thyella	Yarrow	1906	220	20·6	9·0	2	305	6000	30	2 3-in. 1 2-pr.	2 18-in.	70	80 / —
Sphendoni													
Niki	Stettin (Vulcan)	1906	220	20·6	9·0	2	275	6000	30	2 3-in., 4 6-pr.	2 21-in.	70	80 / —
Aspis													
*Aetos, *Leon, *Panther, *Ierax	Birkenhead	1911	293	27·7	9·6	..	1013	19,750	32	4 4-in., (Panther and Aetos, 40 mines)	6 21-in. (T.)	110	— / 260
TORPEDO BOATS—													
Arethusa	Stettin (Vulcan)	1913	147 8	9	4	..	142	2400	25	2 6-pr-	3 18-in.	..	..
Doris													
†Aigli													
†Alkyonis													
‡Pergamos	Fiume	1914	178·4	18·8	5	..	237	5000	28½	1 11-pr.	..	..	..
‡Proussa													
‡Kios	Monfalcone												
‡Kyzikos													
‡Kydonia													
SUBMARINES—							Surf. / Sub.		Surf. / Sub.				
Katsonis	Schneiders, Harfleur	1926	203¾	17·7	12·3	..	567 / 760	1300 / 1000	14 / 9·5	1 4-in., 1 2-pr. A.A.	6 21-in.	30	..
Papanicolis	Ch. de la Loire, Nantes												
Nereus	Ch. de la Loire, Nantes	1927	226½	18¾	12·6	2	689 / 945	1500 / 1200	14 / 9·5	1 4-in., 1 2-pr. A.A.	8 21-in.	45	..
Proteus		1927											
Triton	Ch. de France, Caen	1928											
Glaucos		1928											

Four destroyers are projected.

* Reconstructed by Messrs. J. S. White & Co., Cowes, 1924–25. † On sale list.
‡ Surrendered Austrian torpedo-boats employed on police duties.

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Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Standard Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal. Oil.
			Feet.	Feet.	Feet.		Tons		Knots				Tons.
***Flotilla Leaders—**													
U. Vivaldi	Genoa (Odero)	1929	351 b.p.	33·3	17	..	1628	50,000	38	6 4·7-in. (in pairs) 6 2-pr. A.A. (L. Malocello has 4 1·5-in. A.A.). Carry mines	6 21-in. (T.)	200	— / 500
A. Usodimare		1929											
L. Tarigo	Genoa (Ansaldo)	1928											
L. Malocello		1929											
L. Pancaldo	Riva Trigoso (Cant. Navali)	1929											
A. Da Noli		1929											
E. Pessagno	Ancona (Cant. Navali)	1929											
N. Da Recco		1929											
N. Zeno	Fiume	1928											
G. Da Verazzano		1928											
A. Cadamosto		1929											
A. Pigafetta		1929											
Leone	Ansaldo	1923	359·3 b.p.	34·3	11·5	2	1525	42,000	34	8 4·7-in. (in pairs), 2 3-in. A.A., 60 mines.	6 18-in. (T.)	210	— / 350
Pantera		1924											
Tigere		1924											
Aquila	Pattison	1916	310 b.p.	31	10·8	2	1407	39,800	36·5	4 4·7-in. (in pairs), 2 3-in. A.A., 50 mines	4 18-in. (D.)	140	— / 260
Falco	Pattison	1916					1285						
Premuda (ex-German V116)	.. .. ..	1918	347·8	34	14·2	2	1526	48,000	36	4 5·9 in., 2 2-pr A.A.	4 19·7in. (D.)	150	— / 720
Augusto Riboty	Ansaldo	1915	331·3 b.p.	32·2	9·8	2	1382	35,000	35	8 4-in., 4 2-pr. A.A., 100 mines.	4 18-in. (D.)	150	— / 344
Carlo Mirabello		1914											
Destroyers—													
Spica	Partenopei, Naples	Bldg.	..	..	..	..	615	..	..	4-in. guns.	..	..	..
Astore													
Maestrale	Fiume	Bldg.	341	33	11·4	2	1449	50,000	38	4 4·7-in., 4 smaller A.A.	6 21-in.	..	..
Grecale	Ancona												
Libeccio	Ancona												
Scirocco	Genoa												
Dardo	Odero, Sestri Pozente	1930	311	30	11	..	1206	44,000	38	4 4·7-in. 4 M. A.A.	6 21-in. (T.)	..	oil
Strale													
Freccia	Cant. Navale di Tirreno, Sestri Levante	1931											
Saetta		1932											
Folgore	Cantieri Partenopei, Naples	1931	309	30·5	11	..	1220	44,000	38	4 4·7 in. 4 M. A.A.	6 21-in. (T.)	..	oil
Lampo													
Baleno	Quarnaro Yard, Fiume												
Fulmine													
Borea	Ansaldo, Genoa	1927	311½	30	11	2	1073	35,000	36	4 4·7-in., 3 2-pr. A.A. 3 M., 52 mines	6 21-in. (T.)	140	— / 340
Zeffiro		1927											
Espero		1927											
Ostro		1928											
Aquilone	Odero, Genoa	1927											
Turbine		1927											
Nembo	Genoa Docks Co.	1927											
Euro		1927					1092						
N. Sauro	Odero	1926	295½	30·2	10·5	..	1058	32,000	35	4 4·7-in., 3 2-pr. A.A. 3 M., 52 mines	6 21-in. (T.)	140	— 340
C. Battisti		1926											
F. Nullo	Quanaro, Fiume	1925											
D. Manin		1925											
Francesco Crispi	Naples (Pattison)	1925	278·6	28·2	10	2	935	28,000	35	3 4·7-in., 2 2-pr. A.A. 2 M., 40 mines	2 dbl. 2 1-in.	106	— / 200
Giovanni Nicotera		1926											
Bettino Ricasoli		1926											
Quintino Sella		1925											
Alessandro Poerio	Genoa (Ansaldo)	1914	279	26·3	9·3	2	844	20,000	32	5 4-in., 2 2-pr. A.A.	4 18-in. (D.)	100	— / 250
Gulielmo Pepe													
†Impavido	Naples (Pattison)	1913	239½	24·0	8·4	2	540	13,500	30	5 4-in., 1 2-pr. A.A. 1 M., 10 mines	4 18-in. (D.)	71	— / 110
†Indomito		1912											
†Insidioso		1913											
†Irrequieto		1913											
†Ardente	Orlando (Leghorn)	1912	239½	24·0	8·4	2	560	13,800	30	5 4-in., 1 2-pr. A.A 10 mines	2 18-in.	71	— / 110
†Giuseppe Sirtori	Genoa (Odero)	1916	237¾	24	9·0	2	669	15,000	32–33·8	6 4-in., 4 2-pr. A.A. 2 M.	4 18-in. (D.)	100	— / 150
†Vicenzo Orsini		1917											
†Francesco Stocco		1916											
†Giovanni Acerbi		1916											
†E. Cosenz		1918	237¾	24	9·0	2	635	15,500	31–34	4 4-in., 2 3-in., 2 M. 10 mines.	4 18-in. (D.)	100	— / 150
†Giacomo Medici		1917											
†G. La Farina		1918											
†Nicola Fabrizi		1917											
†Angelo Bassini		1917											
†Giacinto Carini		1917											
†G. La Masa		1917											
†Fratelli Cairoli	Naples (Pattison)	1914	236	24	8·8	2	615	13,500	30	5 4-in., 2 2-pr. A.A. 2 M.	4 18-in. (D.)	71	— / 150
†Antonio Mosto													
†Rosolino Pilo	Genoa (Odero)												
†Giuseppe Abba													
†Ippolito Nievo													
Cesare Rossarol, ex-German B97	Hamburg	1915	321½	30·6	9·5	2	744	40,000	34	3 4·7-in., 2 3-in. A.A 24 mines	4 19·7in. (D.)	114	— / 526

* Designated scouts in Italian official lists.

† Designated torpedo boats in Italian official lists.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Standard Displacement	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS—*contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
*Simone Schiaffino .. *Giuseppe Dezza .. *Giuseppe Missori ..	Genoa (Odero)	1914 1914 1915	236	24	8·8	2	615	13,500	30	5 4-in., 2 2-pr. A.A. 2 M.	4 18-in.	71	— / 150
*Gen. A. Cantore .. *Gen. A. Chinotto .. *Gen. A. Papa .. *Gen. A. Cascino .. *Gen. M. Prestinari *Gen. C. Montanari	Genoa (Odero)	1921 1922	240½	24	9·0	2	635	18,000	30	3 4-in., 2 3-in. A.A. 2 M.	4 18-in. (D.)	100	— / 150
Audace (*ex*-Japanese Kawakaze)	Yarrow ..	1917	287	27·5	8·3	2	628	21,500	34·5	7 4-in., 1 2-pr. A.A.. 2 M.	4 18-in. (D.)	111	— / 252
Ardimentoso, *ex*-German S. 63	Schichau ..	1915	272	27·3	8·6	2	803	24,000	33	3 4-in., 2 3-in., 24 mines	4 19·7in. (D.)	98	— / 305
Solferino, Palestro S. Martino, Curtatone Confienza, Castelfidardo, Calatafimi, Monzambano ..	Leghorn (Orlando)	1921 1922 1923	269 283½	26·5	8·6	2	860 966	18,000	32–33·5	4 4-in., 2 3-in. A.A., 2 M., 24 mines	4 18-in. (D.)	115	— / 170
Cortellazzo .. .. Grado .. .. .. Monfalcone .. .. Zenson (*ex*-Pola) ..	Danubius *ex*-Austrian	1917 1913	274	25·5	8·2	2	561 594	22,000	32	2 3·9-in. 4 3-in. 6 smaller	4 18-in. (D.)	102	110 / 140
TORPEDO BOATS—													
A.S.. 56, 57 .. .. O.L.T., 74, 75 ..	Ansaldo .. Orlando ..	1916–1918	139·5	15	5·5	2	133 169	3,400	28–29	2 3-in. A.A.	2	..	..
SUBMARINES—													
Diamante .. .. .. Smeraldo .. .. .. Rubino & Topasio .. Zaffiro & Amestista Serena, Naiade, Nereide, Anfitrite, Galatea, Ondina	Taranto .. Fiume .. Orlando .. Monfalcone	1933	202	18·5	15	2	590 / 787	1,350 / 800	14 / 8·4	1 3·9-in.	8	..	..
Archimede, Galileo, Torricelli, Ferraris	Taranto ..	Bldg.	..	..	..	2	880 / 1231	3.000 / 1,300	17·5 / 8·5	1 3·9-in.	8	..	..
Glauco, Ontario ..	Monfalcone	Bldg.	..	..	..	2	862 / 1167	3,000 / 1,040	17·0 / 8·5	1 3·9-in.	8	..	..
3 ("Balilla" class)	Spezia.. ..	Bldg.	..	..	..	2	1333 / 1965	4,400 / 1,800	17 / 8·75	1 4·7-in., 1 smaller	8	..	..
Pietro Micca † ..	Taranto ..	Bldg.	..	..	..	..	1371 / 1883	3,200 / 1,500	16·0 / 8·5	2 4·7-in., 1 smaller	6 21-in.	..	..
Squalo, Narvalo, Delfino, Tricheco	Cantiere N., Triestino	1930	229	19	14·5	..	810 / 1077	3,000 / 1,400	16·5 / 9	1 4-in.	6 21-in.	64	..
Argonauta, Fisalia, & Medusa	Cantiere N.. Triestino	1931	200	19·5	13	..	599 / 791	1,200 / 800	14 / 8·5	1 4-in.	6 21-in.	..	..
Jalea & Jantina ..	Odero-Terni												
Serpente (*ex*-Nautilus) & Salpa.. ..	Taranto	1932											
Santorre Santarosa Ciro Menotti	Ansaldo ..	1929	230	19	15·5	..	815 / 1078	3,000 / 1,300	17·5 / 9	1 4-in.	8 21-in.	..	..
Fratelli Bandiera .. Luciano Manara ..	Monfalcone	1929											
Luigi Settembrini .. Ruggiero Settimo ..	Taranto ..	1930					797 / 1134	3,000 / 1,400					
E. Fieramosca ..	Taranto (Tosi)	1930	277	27	16·8	..	1340 / 1760	6,000 / 2,000	19 / 10	1 4·7-in. 1 3·9-in.,	8 21-in.	..	— / 80
M. Bragadino .. F. Corridoni	Taranto (Tosi)	1929 1930	233	18·6	14	2	802 / 1051	1,500 / 1,000	14 / 8	1 4-in., 24 mines	4	..	— / 41
Balilla .. .. .. A. Sciesa.. .. .. E. Toti .. .. .. D. Millelire	Spezia, Ansaldo	1927 1928 1928 1927	285	25·6	14	..	1368 / 1874	4,400 / 2,200	18·5 / 9	1 3·9-in.	6 21-in.	..	— / 140
V. Pisani.. .. .. M. Colonna .. .. Da. Goneys .. .. G. Bausan	Montfalcone, Trieste	1927 1927 1928 1928	223	18·7	13·8	..	791 / 1040	3,000 / 1,000	17·5 / 9	1 4-in. 1 M.	6 21-in.	..	— / 48
G. Mameli .. .. P. Capponi .. .. T. Speri .. .. .. G. Da. Procida ..	Taranto ..	1926 1927 1928 1928	213·3	21·5	13	..	770 / 904	3,000 / 1,000	17 / 9	1 4-in.	6 21-in.	..	— / 48
L. Mocenigo .. .. L. Galvani	Venice.. ..	1918 1919	211·7	20·3	15·6	..	780 / 900	2,600 / 1,300	17 / 10	2 3-in., 1 M.	6 18-in.	32	— / 50
G. Nani	Spezia, F.I.A.T.	1917	218·0	19·3	14	..	703 / 909	2,600 / 1,300	17 / 10	2 3-in., 1 M.	6 18-in.	32	— / 60
X 2, 3	Ansaldo ..	1916	139·9	18	11	..	390 / 460	660 / 360	10 / 6·3	1 3-in. A.A. 1 M., 18 mines	2 18-in.	..	— / 8
H 1, 2, 3, 4, 6, 8 ..	Vickers ..	1917	150·3	15·8	12	..	336 / 466	620 / 480	13 / 10	1 3-in. A.A. 1 M., H1, 4, and 6 only	4 18-in.	22	— / 18
F 6, 13, 20	F.I.A.T. .. Odero and Orlando ..	1916	149·6	13·8	10	..	242 / 313	670 / 250	12·5 / 8	1 3-in. A.A.	2 17·7-in.	22	— / 12
N 3, N 4 .. .. .. N 6	Ansaldo .. Taranto ..	1916 1917	150·5	14	9·9	..	262 / 349	650 / 360	12·5 / 8	1 3-in. A.A. 1 M.	2 18-in.	..	— / 9

* Designated torpedo boats in Italian official lists. † Minelayer.

Japan.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
DESTROYERS :			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
Hatsushima	Uraga												
Ariake	Kawasaki												
Yugure	Maizuru												
Wakaka	Sasebo	Bldg.	338	32·7	8·8	..	1378	..	..	5-in. guns	9	..	..
Nenoi	Uraga												
Hatsuhara	Sasebo												
Oboro	Sasebo												
Akebono	Fujinagata												
Sazanami	Maizuru												
Ushio	Uraga	1929–											
Akatsuki	Sasebo	1932											
Hibiki	Maizuru												
Ikazuchi	Uraga												
Inazuma	Fujinagata												
Sagiri	Uraga	1929											
Asagiri	Sasebo	1929											
Yugiri	Maizuru	1930											
Amagiri	Tokyo	1930											
Shikinami	Maizuru	1929	368 b.p.	34	10·7	..	1700	40,000	34	6 5-in., 2 M.	9 21-in.	210	..
Ayanami	Fujinagata	1929											
Fubuki	Maizuru	1927											
Shirayuki	Yokosuka	1928											
Hatsuyuki	Maizuru	1928											
Miyuki	Uraga	1928											
Murakumo	Fujinagata	1928											
Shinonome	Sasebo	—											
Usugumo	Ishikawa-jima (Tokyo)	1927 1927											
Shirakumo	Fujinagata	1927											
Isonami	Uraga	1927											
Uranami	Sasebo	1928											
Minadzuki	Uraga	1926											
Fumitsuki	Fujinagata	1926											
Nagatsuki	Ishikawajima	1926											
Kikudzuki	Maizuru	1926											
Mikadzuki	Sasebo	1926											
Mochidzuki	Uraga	1927											
Yudzuki	Fujinagata	1927	320 b.p.	30	9·8	2	1315	38,500	3	4 4·7-in., 2 M. A.A.	6 21-in.	148	—/400
Yayoi	Uraga	1924, 25											
Udzuki	Ishikawajima	1925											
Mutsuki	Sasebo	1924, 25											
Kisaragi	Maizura	1925											
Satsuki	Fujinagata	1925											
Oite	Uraga	1924, 25											
Hayate	Ishikawajima	1925											
Yunagi	Sasebo	1924, 25											
Kamikaze	Nagasaki	1922											
Asakaze			320 b.p.	30	9·6	..	1270	38,500	34	4 4·7-in., 2 M. A.A.	6 21-in.	148	—/400
Harukaze													
Matsukaze	Maidzura	1922–24											
Hatakaze													
Asanagi	Fujinagata	1924											
Tanikase	Maizuru		336·5	29	9·3	2	1180	34,000	34	3 4·7-in., 2 M.	6 21-in.	128	—/380
Kawakase	Yokosuka												
Sawakase	Nagasaki												
Okikase, Shimakase,		1916–19											
Nadakase, Yukase,	Maidzuru												
Hakase, Minekase													
Namikase,			320 b.p.	29·25	9·5	2	1215	38,500	34	4 4·7-in. 2 M. A.A.	6 21-in.	149	—/400
Numakase, Nokase,	Mitsubishi,												
Tashikase, Shiokase,	Kawasaki,	1920–22											
Hokase, Yakase,	Maidzuru												
Akikase													
Urakase	Yarrow	1915	287·3	27·6	9·5	—	810	22,000	28	1 4·7-in., 4 3-in.	4 21-in.	116	—/248
SECOND CLASS—													
Wakatake	Kawasaki, Kobe	1922											
Kuretake													
Fuyo	Fujinagata	1922, 23	275 b.p.	26·5	8·3	..	820	21,500	31·5	3 4·7-in., 2 M. A.A.	4 21-in.	110	—/250
Karukaya													
Asagao	Ishikawa-jima												
Yugao		1922–23											
Sanaye	Uraga	1923											
Yanagi, Momo	Sasebo												
Kashi, Hinoki	Maidzuru	1916–18	275·0 b.p.	25·3	7·9	2	755	16,000	31·5	3 4·7 in., 2 M.	6 18-in.	109	92/212
Kaya	Yokosuka												
Nashi, Kaki, Take	Kawasaki												
Kuri	Kure	1917–19	275·5 b.p.	26	8	2	770	21,500	31·5	3 4·7 in., 2 M. A.A.	4 21-in.	80	—/290
Nire, Tsuga	Ishikawa-jima												

6 destroyers (Nos. 65–70) of 1378 tons are projected. To be built up to 1936–7.

Japan—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length (extreme).	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes	Complement	Fuel Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—*contd.* *Second class*—contd.													
Hagi	Uraga												
Susuki, Yomogi	Ishikawa-jima												
Sumire		1920-1922	275·5 p.p.	26	8	2	770	21,500	31·5	3 4·7 in. 2 M., A.A.	4 21-in.	80	— / 290
Hishi, Hasu	Uraga,												
Tade, Fuji	Fujinagata,												
Aoi, Kiku ..	Kawasaki												
Tsuta, Ashi, ..													
TORPEDO BOATS—													
Chidori	Maizuru ..												
Manazuru	Osaka ..	Bldg	254	23	..	..	about 527	..	..	..	..	..	..
Tomazuru	Maizuru ..												
Hatsukari	Fujinagato												
SUBMARINES—		Com-pleted					Surf. / Sub						
I68	Kure	1933											
I69	Kobe		331	27	13	..	1400 / —	..	..	1 5 in. or 3·9 in.	..	..	..
I70	Sasebo.. ..	Bldg											
I71	Kawasaka ..												
I6	Kawasaki ..	Bldg.	..	..	..	..	1900 / —	..	..	..	..	..	..
I5	Kawasaki ..	1932	320	30	15·7	..	1955 / —	6000 / —	17 / —	2 5 in.	6 21-in.	60	..
I65	Kure												
I66	Sasebo ..	1931	321	25·6	15·9	..	1638 / 2100	6000 / 1800	19 / 9	1 4-in. 1 M.	6 21-in.	..	..
I67	Kobe												
I61	Mitsubishi ..	1929											
I62	Kobe	1928	320½	25·7	16	..	1635 / 2100	6000 / 1800	21 / 7·9	1 4·7 in.	6	56	— / 255
I64	Kure	1929											
I4	Kawasaki ..	1929	320	30·2	15·7	..	1955 / 2480	6800 / 1800	17 / 9	2 5·5 in. 1 M.	6 21-in.	61	— / 520
I1, I2, I3 ..	Kawasaki ..	1926											
†I21	..	1927											
†I22	Kawasaki ..	1928	279½	24·6	14	..	1142 / 1470	2400 / 1200	14 / 9·5	1 5·5-in.	4	45	..
†I23		1928											
†I24		1928											
I53	Kure	1927											
I55	Kure	1927											
I56	Kure	1929											
I54	Sasebo ..	1927											
I63	Sasebo ..	1928	331½	26	16	..	1635 / 2100	6000 / 1800	21 / 7-9	1 4·7-in.	8 21-in.	56	— / 255
I60	Sasebo ..	1929											
I59	Yokosuka ..	1929											
I58	Yokusuka ..	1928											
I57	Kure	1929											
Ro. 31	Mitsubishi..	1927	243½	20	12·4	..	655 / 1000	1200 / 1200	13 / 10	1 3-in.	6	43	— / 75
Ro. 65	Mitsubishi..	1926											
Ro. 66	Mitsubishi..	1927											
Ro. 67	Mitsubishi..	1927											
Ro. 68	Mitsubishi..	1925	250	24·2	12·4	..	988 / 1300	2400 / 1800	16 / 10	1 3-in. 1 M.	6	47	— / 75
Ro. 64	Mitsubishi..	1925											
Ro. 63, 62, 61	Mitsubishi..	1924											
Ro. 60	Mitsubishi..	1923											
I. 51 ‡	Kure ..	1924	300	28·7	15	..	1390 / 2000	6000 / 1800	19 / 7-9	1 4·7-in.	8	..	— / 190
I. 52		1925	330	25	16·8								
Ro. 32, 30	Kawasaki ..	1924	243·5	20	12·4	..	655 / 1000	1200 / 1200	13 / 10	1 4-in.	4	43	— / 75
Ro. 29	Kawasaki ..	1923											
Ro. 28	Sasebo ..	1923											
Ro. 27	Yokosuka ..	1924	230 b.p.	20·1	12	..	746 / 1000	2600 / 1200	16 / 10	1 3-in. 1 3-pr.	4 21-in	..	— / 75
Ro. 26	Sasabo ..	1922											
Ro. 59	..	1923	250	23·5	13	..	889 / 1082	2400 / 1200	17 / 10·5	1 3-in. 1 3-pr.	4 21-in	65	— / 76
Ro. 58, 57	..	1922											
Ro. 25, 19, 18, 17 ..	Sasebo, Kure	1921											
Ro. 24	Sasebo ..	1920											
Ro. 23	Yokosuka ..	1923	230	20	12·2	..	735 / 986	2600 / 1200	17 / 10	1 3-in. H.A. 1 3-pr.	6 18-in	43	— / 75
22, 21, 20, 16 ..	Yokosuka, Kure	1922											
Ro. 56, 55	Mitsubishi..	1922											
54, 53	Mitsubishi ..	1921	231·5	23·5	13	..	893 / 1082	2400 / 1200	17 / 10·5	1 3-in. H.A. 1 3-pr.	6 18-in.	65	— / 76
51	Mitsubishi ..	1920											
Ro. 15, 14	Kure .. .. / Kure	1921 / 1920	230	20	12·3	..	736 / 986	2600 / 1200	17 / 10	1 3-in. 1 3-pr.	6 18-in.	48	— / 75

Submarines projected: I72–73 (1400 tons), A and B (700 tons).

† Fitted for minelaying.

‡ Carries small seaplane.

Netherlands.

Name or Number.	Where built.	Launched.	Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-power.	Maximum speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal. / Oil.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
*Banckert .. *Van Nes .. *Van Galen *Witte de With	Burgerhout Rotterdam Fijenoord Rotterdam	1929 1930 1928 1928	321·5	31	9·8	2	1316	31,000	34	4 4·7-in., 1 3-in. A.A., 4 1-pr., 4 M. 1 seaplane 24 mines	6 / 21"	126	— / 330
*De Ruyter *Evertsen .. *Piet Hein .. *Kortenaer	Flushing Rotterdam	1926 1926 1927 1927	321·5	31	9·8	2	1316	31,000	34	4 4·7-in. 2 3-in. A.A. 24 mines 1 seaplane	6 / 21"	126	— / 330
1ST CLASS TORPEDO BOATS—													
†Zeeslang, †Krokodil, †Draak,	Flushing	1907 1906 1906	130	13·8	6·9	1	87–90	1560–1580	24	2 1-prs.	2 / 17·7"	20	20 / —
G 13, 15 and 16 ..	Scheldt Fijenoord	1913–1914	162·5	17·3	9·0	..	150	2,600	25	2 3-in.	3 / 17·7"	27	40 / —
Z 1-4 ..	Amsterdam	1916–1917	201	20·4	6	2	277	5,500	27	2 3-in., 2 M.	4 / 17·7"	39	61 / 8
Z 5-8 ..	Scheldt Fijenoord	1915	192	19·8	5·5	2	264	5,500	27	2 3-in., 2 M.	4 / 17·7"	39	70 / 7
‡G 12 and 2	..	1903–7	..	..	..	..	112	..	..	..	3 / 17·7"	..	..
SUBMARINES—							Surf. / Sub.						
K XIV .. K XV .. K XVI ..	Rotterdam	1932–3	242	21·5	13·3	..	810 / 1,000	3000 / 1000	17 / 9	1 3·5-in., 2 2-pr.	6	..	..
K XVII .. K XVIII ..	Fijenoord	1932–3	..	..	..	..	825 / 1,020	..	..	..	..	..	..
O 12 .. O 13 .. O 14 .. O 15 ..	De Schelde	1931	19·9	18·7	11·5	..	560 / 700	1,900 / 600	15 / 8	2 1·5-in. A.A.	5 / 21"	..	..
†K XIII .. †K XII .. †K XI	Fijenoord	1924	218·8	20·2	12·2	..	660 / 810	2,400 / —	15 / 8	1 22-pr., 1 maxim	6	31	— / 45
O 11 .. .. O 10 .. O 9	Fijenoord Amsterdam Flushing	1925	179½	18·7	11½	..	506 / 627	900 / —	12¾ / 9	1 22-pr. A.A., 1 maxim	5 / 21"	29	— / 21
O 8 (ex-British H6)	..	1914	150·3	15·8	12·3	..	364 / 434	480 / 320	13 / 8·5	1 maxim	4 / 17·7"	26	— / 18
M1 (ex-German UC 8)	Hamburg	1915	111½	10·3	9	..	157 / 176	80 / 155	7½ / 5	1 4-pr. 12 mines	—	16	— / 2½
O 7	Fijenoord	1916	112	12·8	9·5	..	177 / 206	350 / 185	11·5 / 8·5	1 maxim	3 / 17·7"	12	— / 5·4
O 6	De Schelde	1916	115·9	12·8	9·5	..	187 / 226	350 / 185	11·5 / 8·5				
O 5 .. .. O 4 .. .. O 3	De Schelde De Schelde De Schelde	1913 1913 1912	105·3	10·2	9·5	..	129 / 147	300 / 170	11 / 8·5	1 maxim	2 / 17·7"	10	— / 3·6
†K X .. †K IX .. †K VIII ..	De Schelde	1923 1922 1922	212	18·3	11·9	..	560 / 690	1,550 / 630 1,550 / 630 1,800 / 630	15 / 8	1 22-pr. 1 maxim	4 / 17·7"	29	— / 45
†K VII .. †K VI .. †K V	Fijenoord	1921 1920 1919	177·2	16·8	12·5	..	550 / 630	1,200 / 600	15 / 8	1 3-in., 1 maxim	6 / 17·7"	29	— / 76
†K IV .. †K III ..	De Schelde	1920 1919	211·3	18·3	11·5	..	560 / 700	1,200 / 600 1,800 / 600	15 / 8	1 3-in., 1 maxim	6 / 17·7"	29	— / 45
†K II.. ..	Fijenoord	1919	172·3	16·8	12·5	..	550 / 600	1,800 / 600	15 / 8	1 3-in., 1 maxim	6 / 17·7"	29	— / 76

Two flotilla leaders (2,500 tons, eight 4·7" guns), are projected but no money voted. Four destroyers, Nos. IX–XII are projected but no money voted. Eight submarines, O 16 and O 17, K XIX, K XX, K XXI, K XXII, KXXIII, K XXIV, are projected but no money voted.

*** Dutch East Indian Fleet. † Indian Military Marine. ‡ For harbour service only.**

Norway.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Destroyers—													
Draug, Troll, Garm	Horten ..	1908–13	226	23·5	8·8	2	540	7,500 (Garm 8,000)	27·0	6 3-in. Draug has 6 4·7-in. in addition	3 18-in.	71	95 / 6
Torpedo Boats:													
First Class—													
Snogg, Stegg, Trygg	Horten ..	1919–1920	173·9	18	5½	2	250	3,500	25	2 3-in.	4	31	30 / —
Hval*	Elbing ..	1896–	130·0	16·0	6·9	1	100	1,100	21	2 M.	2	19	17 / —
Storm, Brand ..	Horten ..	1900											
Laks, Sild, Sael, Skrei	Horten ..	1901	126·4	15·0	6·9	1	100	1,150	21·8	2 M.	2 18″	19	
Second Class—													
*Kjek, Hvas, Kvik, Blink	Fredrikstad	1898	114·5	14·5	6·0	1	73	650–750	19–20	2 M.		14	11 / —
Lyn, Hauk, Falk	Horten ..	1903											
Skarv, Teist	Horten ..	1906–7	133	14·5	6·5	1	100	1,600	25	2 3-pr.	2 18″	18	16 / —
Lom, Jo, Grib.. ..			117	14·5	5·7	1	72	1,100	23	2 M.		16	15 / —
Ravn, Orn	Horten ..	1903	113	14·5	5·7	1	73	850	23	2 M.		16	
Kjell	Horten ..	1912	135	14·9	6·4	1	100	1,800	25	2 3-pr.		19	15 / —
Submarines—													
A 2, 3, 4	Germania Kiel	1909 to 1913	133·2	15·7	8·9	2	246 / 332	900 / 380	14 / 7	—	3 18″	17	— / 12·8
B 1, 2	Horten ..	1922	167·3	17·5	10·5	2	413 / 545	900 / 640	14·5 / 10	1 12-pr.	4 18″	23	— / 21
B 3, 4	Horten ..	1923–24											
B 5, 6	Horten ..	1929											

3 destroyers (1000 tons, 32 knots, 3 4·7-in. guns), 6 torpedo boats (250 tons), and 10 submarines (500 tons), projected.
* Employed as patrol ships.

Soviet Union.

Some of the details given below are uncertain.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Destroyers—													
Two in number ..	..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Felix Dzerzhinski, Petrovìski .., Nezamojni .., Shaumyan ..	Ship & Eng. Co., Nikolaev	1917	303·5	29·5	10·5	..	1326	29,000	33	4 4-in., 2 7-pr., 4 M., can carry 80 mines	12 18″ (T.)	120	— / 390
Karl Marx .., Kalinin	Revel.. ..	1915	344·5	31·3	9·7	..	1350	32,700	35	5 4-in., 1 3-in. A.A., carries mines	9 18″ (T.)	110	— / 400
Uuritsky .. .., Volodarski ..	Leningrad..	1914	321·5	30·5	9·25	..	1610	32,000	35	4 4-in., 1 3-in. A.A., 2 M., 80 mines	9 18″ (T.)	110	— / 400
Rykov .. .., Engels .. .. *, Stalin .. .., Artem .. .., Volkov .. .., Lenin	Leningrad..	1914–1915	314·75	30·5	9·75	..	1260	30,000	35			110	— / 350
Bezpokoini* .., Gnyevni* .., Derski*	Nikolaev ..	1913–14	307·7	29·5	9	..	1088	25,500	34	3 4-in., 2 3-pr., 4 M.	10 18″ (D.)	140	— / 260
Pospyeshni* .., Puilki*	Leningrad..	1913–14	321·5	30·5	9·8	..	1100	23,000	34	3 4-in., 2 3-pr., 4 M., 80 mines	10 18″ (D.)	120	— / 351
Frunze	Leningrad ..	1914	336	31·1	9·8	..	1100	23,000	34	4 4-in., 1 3-in., 4 M.	6 (D.)	120	— / 350

* Under French protection at Bizerta.

Soviet Union—*continued.*

Name or Number.	Where Built.	Date of Completion.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surf./Sub.	Horse-Power	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
SUBMARINES—													
B4 and 5	Nikolaiev ..												
Revoluzioner	Nikolaiev ..	Bldg.	279	23	16½	..	1100 / —	1500 / 1200	16 / 10	1 3-in. 1 1-pr.	6	..	..
Yakobinetz	Nikolaiev ..												
Spartakovetz	Sevastopol												
Dekabrist	..	1931	279	23	16½	..	1000 / —	1500 / 1200	16 / 10	1 3-in.	6	..	..
Narodvoietz													
Politrabotnik (ex-Ag 26)	..	1924	150¼	15¾	5¼	..	355 / 467	480 / 320	13 / 11	1 6-pr.	4 18″		
Marxist (*ex*-Ag 25)	..	1922	150¼	15¾	15¼	..	375 / 467	480 / 320	13 / 11	1 6-pr.		..	..
Kommunist(*ex*-Ag 24)	..	1922											
Shakter (*ex*-Ag 23),	..	..											
Ag 22*	..	1920	..	..	..	..	..	..	13 / 7·5	1 4-in., 2 M.	6 18″	..	— / 17
Proletary	..	1916	223	14·5	12·5			2640 / 900	16 / 9	1 6-pr., or 2 6-pr., 1 M.	4	33	— / 40
Rabotchky	..	1917						2640 / 900	16 / 9	42 mines	4	..	
Tyulen*	..	1915	220	14·5	12·7			500 / 1400	10 / 11·7	1 4-in. 1 6-pr., 2 M.	4	52	— / 2
Politruk	..	1913											
Utka*	..	1916											
Burysevyestnik* ..	..	1918	223	14·5	12·5		650 / 784	500 / 900	10 / 9	2 11-pr., 1 1-pr., 1 M.	4	52	— / 40
Batrak	..	1917						2640 / 900	16 / 9	1 11-pr.	4	33	
Krasnoarmeyets ..	..	1917	223	14·5	12·6			2640 / 900	16 / 9	2 6-pr., 1 1-pr.	4	33	..
Komissar	..	1916											
Bolshevik	..	1916											
Komunar (*ex*-Tigr)	..	1916						500 / 900	10 / 9	2 6-pr., 1 1-pr., 1 M.	4	33	— / 40
Tovaristch	..	1916											
Krasnoflotetz ..	..	1916											
Bedryak		1916											
L55 (*ex*-British, raised from Baltic)	..	..	230 b.p.	23·5	13·2	..	900 / 1150	2400 / 1600	17·5 / 10·5	2 4-in. guns	6 21″	..	— / 78

In addition to the above about four other submarines are understood to be building or authorised. * Under French protection.
There are about thirty-five destroyers and torpedo-boats completed from 1895 to 1912 of very little if any fighting value.
Many of the above vessels are known to be practically useless until very extensively repaired and refitted.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FLOTILLA LEADERS—													
Five in number ..	..	Bldg.	..	..	..	..	1536	..	..	..	..	..	..
Almirante Valdés..	Cartagena ..	Bldg.	331¾	31·7	10·5	2	1,536	42,000	36	5 4·7-in. 1 3-in. A.A. 4 M.	6 21-in. (T.)	..	— / 540
,, Antequera	Cartagena ..	Bldg.											
,, Miranda	Cartagena ..												
Churruca	Cartagena ..	1929											
Alcala Galiano ..	Cartagena ..	1930											
Lepanto	Cartagena ..	1928											
Almirante Ferrandiz	..	1928											
José Luis Diez ..	Cartagena ..	1928											
Sanchez-Barcaiztegui	Cartagena ..	1926											
DESTROYERS—													
Alsedo	Cartagena ..	1922	283	27	9	2	1,145	33,000	34	3 4-in., 2 2-pr. A.A.	4 21-in. (D.)	70	— / 265
Velasco	Cartagena ..	1923											
Juan Lazaga	Cartagena ..	1924											
Villaamil (Minelayer)	Cartagena ..	1913	221¼	22¼	7	..	539	6,250	28	5 6-pr.	4 18-in.	70	80 / —
TORPEDO BOATS—													
12 boats	Cartagena ..	1913–1922	164	16·5	4·9	3	187	3,750	26	3 3-pr.	3 18-in.	31	33 / —
SUBMARINES—													
D1	..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
C 2-6..	Cartagena ..	1928–1929	240	20·8	13·5	..	900 / 1270	2000 / 750	16 / 8·5	1 4-in., 1 3-in. A.A.	6 21-in.	..	..
Isaac Peral (*ex*-C 1)	Cartagena ..												
B 1-6	Cartagena ..	1921-24	210	18·9	11·25	..	560 / 830	1400 / 850	16 / 10·5	..	4 18-in.	28	— / 66
A1	..	..	..	..	..	..	185	..	..	..	..	..	..

11 submarines are authorised (1926 programme).

Sweden.

Name or Number.	Where Built.	Launched.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal / Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Destroyers—													
Klas Horn	Malmo	1931	303·2	29·2	10·5	..	881	24,000–26,000	35	3 4·7-in., 2 2-prs. A.A., 2 M.	2 trpl. 21"	125	— / 150
Klas Uggla	Karlskrona												
Ehrensköld	Göteborg	1926											
Nordenskjold	Malmö												
Magne	Thornycroft	1905	216	20·8	9	2	354	8,000	30	6 6-prs.,	2 18"	..	80 / —
Wale..	Malmo ..	1906	216	20·8	9	2	354	8,000	30	2 3-in., 4 6-prs.	4 18"	..	
Ragnar†	Malmo ..	1909	216	20·8	9	2	354	8,000–9,000	30·0	4 3-in., 2 M.	4 18" (D.)	67	80 / 3
Sigurd	Gothenburg	1909											
Vidar	Malmo ..	1909											
Hugin	Gothenburg	1909											
Munin	Malmo ..	1910											
Wrangel †	Gothenborg	1917	232·8	22	9·2	2	458	11,000	34·0	4 3-in., 2 M.	6 18"	72	107 / 6
Wachtmeister ..													
*** Torpedo-Boats—**													
1st Class—													
Castor‡, Pollux‡ ..	Normand & Carlskrona	1908	128	14·5	8·5	1	103	2,000	25	2 6-prs. (except Castor and Pollux 2 1-prs.)	2 18" (‡)	18	20 / —
Vega‡	Carlskrona..	1909											
Vesta‡													
Spica, Astrea, Iris, Thetis	Bergsund and Gothenburg	1909											
Altair‡	Stockholm ..	1908											
Antares‡													
Argo‡													
Arcturus‡													
Perseus, Polaris ..	Bergsund ..	1910–1915											
Regulus, Rigel ..	Stockholm ..												
Submarines—													
1st Class—													
Ulven	Naval Yard, Karlskrona	1930	217	21	10·8	..	700 / 850	2800 / —	16 / 9	1 4-in., 1 M.	4 20-in.	32	— / 40
Draken		1926											
Gripen		1928											
Bavern	Naval Yard, Karlskrona	1921	187	19·4	9·2	..	500 / 650	2800 / —	15 / 9	1 3-in., 1 M.	4 18"	..	— / 33
Illern													
Uttern													
Svärdfisken	Kockum Co., Malmo	1914	137·7	12·5	9·8	..	300 / —	800 / —	15 / 9	1 6-pr.	2 18"	..	— / 8
Tumlaren													
Sälen	Kockum Co., Malmo ..	1920	177 2	16·2	11 2	..	450 / 580	..	..	1 3-in., 1 M.	4 18"	..	— / 23
Valrossen													
Hajen													
Minelaying Sub.—													
Valen	..	1925	187 2	23·2	9·4	..	500	..	..	1 3-in., 1 M.	4 18"	..	— / 34
2nd Class—													
Aborren	Karlskrona D.Y. ..	1914–15	101·7	11·7	10 2	..	173	..	..	..	2 18"	..	— / 6·5
Braxen													
Laxen			88·6	11·7	10·2	..	133	..	..	..	1 18"	..	— / 4·0
Gäddan													

† Fitted for mine-laying.

* Also six small 2nd class torpedo-boats, Nos. 5–9, 14 (60 tons, 20 knots, built 1907–1908), and two motor torpedo-boats, Nos. 3 and 4. Two minelaying submarines B 1 and B 2, 502 tons, are building.

‡ Torpedo-boats marked ‡ have one 18-inch tube only.

United States.

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Standard Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Phelps, Clark, Moffett, Balch	Bethlehem S.B. Co.	Bldg.	..	..	..	..	1,850	..	..	..	..	..	..
No. DD 353	Navy Yard, N.Y.												
Monaghan ..	Navy Yard, Boston	Bldg. est. 1935											
Aylwin ..	Navy Yard, Philadelphia												
Farragut ..	Bethlehem S.B. Co.		334	34½	9½	..	1,500	42,800	36½	5 5-in. A.A. 8 or 10 M.	8 21-in. (Q)	160	400
Dewey	Bath, I.W.Co.												
Hull	Navy Yard, N.Y.	Bldg. est. 1934											
MacDonough	Navy Yard, Boston												
Worden ..	Navy Yard Puget Sound												
Pruitt		1920						25,000					
Sicard	Bath, I.W.												
Preble ..		1920											
William B. Preston ..		1920											
Noa	Norfolk, N.W.	1921											
Hulbert ..		1920											
Decatur ..		1922						24,200					
Perry		1922											
Trever ..	Navy Yard, Mare Is.	1922											
Wasmuth ..		1921											
Zane		1921											
Litchfield ..		1920											
Marcus ..	..	1921											
Sloat	..	1920											
Meade ..													
Swasey ..													
Tingey ..													
Morris ..													
Thornton ..	Bethlehem S.B. Co., Squantum												
Bailey ..													
Shubrick ..													
Ballard ..													
Greene ..													
Edwards ..													
McLanahan													
Laub		1919						27,000					
Gillis													
Turner.. ..													
Aulick ..													
Welles ..													
Bancroft ..	Bethlehem S.B. Co., Quincy												
Osmond Ingram			314·4	31	9·	..	1,190		35	4 4-in., 1 3-in. A.A. (Kane, Fox, Brooks, and Hatfield have 4 5-in. guns.)	4 triple 21-in.	122	375
Rodgers ..													
McCalla ..													
McCook ..													
Belknap ..		1919											
Lawrence ..		1921											
Hopkins ..		1921											
Barry ..		1920											
Goff		1921											
Bainbridge ..		1921											
Reuben James													
Williamson													
Sands													
King													
Childs	New York S.B. Co.												
Sturtevant ..													
Overton ..													
James K. Paulding		1920						26,000					
McFarland ..													
Humphreys													
Kane													
Fox													
Gilmer ..													
Brooks ..													
Hatfield ..													
Paul Jones		1921											
Truxton ..													
John D. Ford	Cramp, Pa.												
Pillsbury ..													
Peary		1920											
Pope ..													

* In addition to these ordered under the ordinary annual appropriations for 1933–4, four destroyers (1850 tons) and sixteen destroyers (1500 tons) were authorised in July, 1933, under the National Industrial Recovery Act (see p. 267). Contracts have been placed as follows: 4 destroyers (1850 tons), Porter, Selfridge, McDougal and Winslow, with New York S.B. Co.; Mahan and Cummings (1,500 tons) with United Dry Docks, Inc., N.Y.; Drayton and Lamson (1,500 tons), Bath Iron Works Corp.; Flusser and Reid (1,500 tons), Federal Shipbuilding Co., N.J.; Case and Conyngham (1,500 tons), Boston Navy Yard; Cassin and Shaw (1,500 tons), Philadelphia Navy Yard; Tucker and Downes (1,500 tons), Norfolk Navy Yard; Cushing and Perkins (1,500 tons), Puget Sound Navy Yard; Smith and Preston (1,500 tons), Mare Island Navy Yard.
It is probable that some of the destroyers under construction will be renamed.

United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Standard Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—*continued.*													
Stewart ..													
McCormick													
Bulmer ..													
Simpson ..													
MacLeish ..													
Edsall	Cramp, Pa.	1920											
Parrott ..													
Whipple ..													
J. D. Edwards													
Borie								26,000					
Tracy ..													
Barker ..													
Smith Thompson													
Alden ..													
Broome ..		1919											
Long													
Hovey ..			314·4	31	9·8	..	1,190		35	4 4-in., 1 3-in. A.A. (Semmes has a 5·4-in. Long and Hovey have 8 4-in. in twin mtgs. and 1 3-in. A.A.)	4 triple 21-in.	122	375
Southard ..													
Chandler ..													
Dallas													
*Herndon ..													
Branch ..		1920											
*George E. Badger													
*Welborn C. Wood	Newport News S.B. Co.	1921											
*Hunt		1920						25,000					
*Abel P. Upshur		1920											
Mason ..		1920											
Satterlee ..		1919											
Goldsborough		1920											
Dahlgren ..													
Clemson ..		1919											
Bagley													
Abbot													
Haraden ..		1919	314·4	31	9·8	..	1,060	25,000	35	4 4-in., 1 3-in A.A.	4 triple. 21-in.	122	286
Thomas ..													
Hopewell ..													
Stansbury ..		1920											
Howard ..		1920											
Hogan ..													
O'Bannon ..	Union I.W.												
Renshaw ..													
Mackenzie ..													
Kalk													
Foote ..													
Maddox ..		1919	314·4	31	9·8	..	1,060	27,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	283
Cowell ..													
Bush	Fore River S.B. Co.												
Meredith ..													
Crosby ..													
Walker ..													
Thatcher ..													
Palmer ..		1918											
Herbert ..													
Schenck ..	N.Y. S.B. Co.		314·4	31	9·8	..	1,090	26,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Leary ..													
Dickerson ..													
J. Fred Talbot													
Cole													
Ellis													
Bernadou ..		1919											
Dupont ..													
Biddle ..													
Blakeley ..													
Barney ..	Cramp, Phil.		314·4	31	9·8	..	1,090	26,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Breckenridge													
Roper													
Elliot ..													
Greer													
Upshur ..													
Yarnall ..		1918											
Tarbell ..													
Hamilton ..		1919											
Claxton ..		1919											
Ward	Mare Island, N.Y.	1918						24,200					
Kennison ..		1919											
†Kilty		1918											
†Boggs		1918	314·4	31	9·5	..	..		35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Tillman ..		1921						26,000					
Crowninshield													
Hale	Bath I.W.	1919						24,200					
Aaron Ward													
Buchanan ..								26,000					

* Operated by the U.S. Coast Guard. † Equipped as targets.

United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
DESTROYERS—*continued.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Jacob Jones													
Babbitt ..	New York S.B. Co.												
Twiggs ..		1919	314·4	31	9·8	..	1,090	26,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Badger ..													
Tattnall ..													
Radford	Newport News S. Co.												
Lamberton ..		1919	314·4	31	9·8	..	1060 / 1090	25,000	35	4 4-in. 1 3-in. A.A	4 triple 21-in.	122	286
Lea		1918											
Dorsey ..													
Dent	Cramp, Pa.		314·4	31	9·8	..	1,090	26,000	35	4 4-in., 1 3-in. A.A. (Rathburne has 3 4-in.)	4 triple 21-in.	122	286
Waters ..													
Talbot ..													
Rathburne ..													
Crane		1919											
Williams ..		1919											
Chew	Union Plant.												
Mugford ..			314·4	31	9·8	..	1,060	27,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	283
Champlin ..													
Schley ..													
Bell	Fore River S.B. Co.	1918											
Taylor ..	Mare Island, N.Y.	1918	314·4	31	9·8	..	1,090	27,000 / 24,200	35	4 4-in., 1 3 in. A.A.	4 triple 21-in.	122	286
Fairfax ..													
Gridley ..		1919											
Harding ..		1919											
McKean ..	Union I.W.	1919											
Ringgold ..		1918	314·4	31	9·9	..	1,060	27,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Robinson ..		1918											
McKee.. ..		1918											
Stevens ..													
Colhoun ..													
Dyer													
Stringham ..	Fore River S.B. Co.		314·4	31	9·8	..	1,060	27,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	283
Gregory ..													
Sigourney ..		1918											
Kimberly ..													
Little													
Evans							27,000						
Philip	Bath I.W.		314·4	31	9·7	..	1,090	27,000	35	4 4-in., 1 3-in. A.A.	4 triple	122	286
Wickes ..								24,200					
Manley ..		1917						20,000	32	8 4-in., 1 3-in. A.A.			
Stockton ..	Cramp Pa.	1917						18,500	30	5 4-in., 1 3-in. A.A.			
Conner ..		1918											
Gwin	Seattle D.D. Co.	1920	315·5	30·7	9·5	..	1020	18,750	30	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	260
Craven ..	Norfolk, N.Y.	1918						20,000	32	4 4-in., 1 3-in. A.A.			
Caldwell ..	Mare Island N.W.	1917						21,000	30	4 4-in., 1 3-in. A.A.			
Allen	Bath I.W.	1917	315·3	29·9	9·8	..	920	17,500	30	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	290
Rowan ..	Fore River S.B. Co.	1916	315·3	29·9	10·7	..	920	17,000	29·5	4 4-in., 1 3-in. A.A.			
Sampson ..													
Wadsworth..	Bath I.W.	1915	315·3	29·9	10	..	910	17,500	30	4 4-in.	4 dbl. 18-in.	118	310
Cushing ..	Fore River S.B. Co.	1915	305·3	30·4	10·5	..	860	17,000	29	4 4-in. 1 3-in. A.A.	4 dbl. 18-in.	106	308
Winslow ..													
Nicholson ..		1915	305·3	30·3	10·5	..	860	17,000	29				
O'Brien ..													
Balch		1914											
Benham ..		1914											
Parker ..	Cramp.	1913	305·3	30·5	10·5	..	820	16,000	29·5	4 4-in. 1 3-in. A.A. (*ex*-Parker 4 4-in.)	4 dbl. 18-in.	106	310
Aylwin ..		1914											
Duncan ..	Fore River S.B. Co.	1913	305·3	30·4	10	..	820	16,000	29				
Downes.. ..	N.Y.S.B. Co.	1915											
*Cummings	Bath I.W.	1913	305·3	30·4	9·8	..	820	16,000	29	4 4-in.	4 dbl. 18-in.	104	306
*Cassin ..													
*McDougal ..	Bath I.W.	1914	305·3	30·6	9·8	..	860	16,000	29·5				311
*Ericsson ..	N.Y.S.B. Co.	1915	305·3	30·6	10·7	..	860	17,000	29				305
*Tucker	Fore R.S.B.Co.	1916	305·3	29·9	10·3	..	910	17,000	29·5				309
*Conyngham ..	Cramp.	1916	315·3	29·9	10·1	..	910	18,500	29·5	4 4-in.	4 dbl. 18-in.	104	308
*Porter	Cramp.	1916	315·3	29·9	10·1	..	910	18,000	29·5				308
*Wainwright ..	N.Y.S.B. Co.	1916	315·3	29·9	10·7	..	910	17,000	29·5				308
*Davis	Bath, I.W.	1916	315·3	29·9	9·8	..	920	17,500	30				290
*Wilkes	Cramp.	1917	315·3	29·9	10·7	..	920	18,000	29·5	4 4-in. 2 3-in. A.A.	4 triple 21-in.	120	290
*Shaw	Mare I., N.Y	1916	315·3	29·9	10·7	..	910	17,000	29·5				290

In addition to the above there are 21 obsolete destroyers of the Flusser Class, completed 1910–1912. Their displacement is 650 tons, 29·5 knots, 10,520–12,000 H.P., 3 to 5 3-in. A.A. guns, and 3 double torpedo tubes. Their names are Mayrant, Henley, Jarvis, Beale, Fanning, Jenkins, Jouett, Patterson, Walke, Monaghan, Ammen, Trippe, Warrington, Burrows, McCall, Sterrett, Perkins, Drayton, Terry, Paulding, Roe. 8 of these are on the disposal list.

Destroyers Hazelwood, Stoddert and Sinclair are employed as target ships.

* Operated by the U.S. Coast Guard.

United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
			Feet.	Feet.	Feet			Tons.	Knots.				Tons.
DESTROYERS NOW FITTED AS MINELAYERS—													
Sproston ..	Union I.W.	1919											
Anthony ..													
Ingraham ..													
Lansdale ..	Fore River S.B. Co.	1918											
Luce													
Israel			314·4	30·5	9	2	1,160	27,000	35	4 4-in. 1 3-in. A.A. 92 mines	—	107	283
Murray ..													
Stribling ..													
Lamsay ..	Newport News S. Co.	1918											
Gamble ..													
Breese		1919	314·4	30.5	9	2	1,160	25,000	35	4 4-in. 1 3-in. A.A.	—	120	286
Montgomery													

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surface. / Submerged.	Horse-Power.	Maximum Speed. Surface. / Submerged.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
			Feet.	Feet.	Feet.		Tons.		Knots				Tons.
SUBMARINES—													
V7 Dolphin	Portsmouth Navy Yard.	1932	319	27·7	13	..	1,540 / 2,215	4.250 / —	17 / 8	1 4-in.	6 21″	58	..
V8 Cachalot V9 Cuttlefish	Electric Boat Co.	1933	275	24·8	13	..	1,130 / 1,650	3,100 / —	17 / 8	1 3-in. A.A.	6 21″	..	..
V4 Argonaut	Portsmouth Navy Yard.	1928	381	33·7	15·4	..	2,710 / 4,080	3,175 / —	15 / 8	2 6-in., 60 mines	4 21″	86	..
V5 Narwhal V6 Nautilus	Portsmouth Navy Yard. Mare Island Navy Yard.	1930	371	33·3	16	..	2,730 / 3,960	5,450 / —	17 / 85	2 6-in.	6 21″	88	..
V3 Bonita .. V2 Bass .. V1 Barracuda	Portsmouth Navy Yard.	1926 1925 1924	341·5	27·5	15·5	..	2,000 / 2,506	6,700 / —	14 / 9	1 5-in. (Bass has 1 3-in. A.A.)	6 21″	87	..
S48	Lake T.B. Co., Bridgeport	1922	265·3	21·8	13·5	..	1,000 / 1,458	2,000 / 1,500	14·8 / 11·0	1 4-in.	5 21″	..	237
S47*	Bethlehem Shipbuilding Corp., Quincy Plant	1925	225·3	20·5	16	..	850 / 1,126	1,200 / 1,500	14 / 10	1 4-in.	4 12″	44	154
S46*		1925											
S45*		1925											
S44*		1925											
S43*		1924											
S42*		1924											
S41*	Bethlehem Shipbuilding Corp., Union Plant	1924											
S40*		1923											
S39*		1923											
S38*		1923											
S37*		1923											
S36*		1923											
S35*		1923											
S34*		1923											
S33*		1923											
S32*		1923											
S31*		1923											
S30*		1920	219·3	20·5	16	2	800 / 1,062	1,200 / 1,500	14·5 / 11	1 4-in.	4 21″	42	140
S29*	Bethlehem Shipbuilding Corp., Quincy Plant	1924											
S28*		1923											
S27*		1924											
S26*		1923											
S25*		1923											
S24*		1923											
S23*		1923											
S22*		1924											
S21*		1923											
S20*		1922											
S19*		1921											
S18*		1923											

* Designed by Electric Boat Co., Groton, Conn.

Four submarines were authorised in July 1933, under the National Industrial Recovery Act (see page 271). Two of these (Shark and Tarpon) are to be built by the Electric Boat Co., Groton, and two (Porpoise and Pike) in Portsmouth Navy Yard.

United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions. Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement. Surface. / Submerged.	Horse-Power.	Maximum Speed. Surface. / Submerged.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots				Tons.
SUBMARINES—*continued.*													
S17, S16, S15, S14	Lake T.B. Co., Bridgeport	1921, 1920, 1921, 1921	231	21·5	13	..	790 / 1,092	2,000 / 1,200	15·25 / 9	1 4-in.	4 21"	38	123
S13, S12, S11, S10	Navy Yard, Portsmouth	1923, 1923, 1923, 1922	231	21·8	13	..	790 / 1.092	2,000 / 1,200	14·75 / 9	1 4-in.	5 21"	38	123
S9, S8, S7, S6, S4†, S3	Navy Yard, Portsmouth	1921, 1920, 1920, 1920, 1919, 1919	231	21·8	13	..	790 / 1,092	1,400 / 1,200	14 / 9	1 4-in.	4 21"	38	123
S1*	Fore River S.B. Co.	1920	219·3	20·7	16	..	800 / 1,062	1,200 / 1,500	14·5 / 11	1 4-in., 1 aeroplane	4 21"	38	140
R20*, R19*, R18*, R17*, R16*, R15*	Union, I.W.	1918	186·1	18	14·5	2	530 / 680	880 / 934	13·5 / 10·5	1 3-in.	4 21"	30	63
R14*, R13*, R12*, R11*, R10*, R9*, R8*, R7*, R6*, R5*, R4*, R3*, R2*, R1*	Fore River S.B. Co.	1919	186·1	18	14·5	2	530 / 680	880 / 934	13·5 / 10·5	1 3-in.	4 21"	30	63
O10*§, O9*§, O8*§, O7*§, O6*§, O4*§, O3*§, O2*§, O1*§	Fore River S.B. Co.	1918	172·3	18	14·4	2	480 / 629	880 / 740	14 / 10·5	1 3-in.	4 21"	30	73

* Designed by Electric Boat Co., Groton, Conn.
† Used for salvage operations.
§ To be disposed of shortly.

A submarine named Neff (No. 108) was authorised in 1916—no funds are yet voted for construction.
The machinery contractors for the vessels of the E. B. Co. Design built in yards other than the Navy Yards were the New London Ship and Eng. Co., Groton, Conn., and the hulls were built under sub-contract from the E. B. Co.

TABLES OF COMPARATIVE NAVAL STRENGTH

Table I.—Effective Fighting Ships, Built, Building, and Authorised.

Class.	British Empire.			U.S.A.			Japan.			France.			Italy.			Soviet Union. (w)			Germany.		
	Built.	Building.	Authorised.	Built.	Building.	Authorised.	Built.	Building.	Authorised.	Built.	Building.	Authorised.	Built.	Building.	Authorised.	Built.	Building.	Authorised.	Built.	Building.	Authorised.
Battleships, 14-in. guns and upwards	12	—	—	14	—	—	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Battleships, smaller guns	—	—	—	1	—	—	—	—	—	9	1	—	4	—	—	5	—	—	5	2	1
Battle-cruisers	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Aircraft and seaplane carriers	8 (b)	—	—	3	1	2 (z)	6 (c)	—	—	2 (d)	—	—	1 (e)	—	—	—	—	—	—	—	—
(f) Cruisers, guns above 6·1-in.	19	—	—	12(m)	5	2 (g)	12 (h)	—	—	9	1	—	11 (k)	—	—	—	—	—	—	—	—
(f) Cruisers, guns 6·1-in. and below	34(j)	8	3 (l)	10	—	4 (z)	19 (i)	2	2	8 (n)	6	—	13	6	—	8	2	—	6	—	—
Flotilla Leaders and Destroyers	158	18	9 (l)	222(o)	8	24(a)	93	6 (p)	(q)	72(r)	11	—	91 (s)	6	—	?55(y)	2	—	16(t)	—	(u)
Submarines	56	6	3 (l)	82	2	4 (z)	62	5	(v)	84	25	—	46	25	—	22	?9	?1	—	—	—

Notes.—

(a) Includes 4 destroyers (1850 tons) authorised, and contracts placed, under the ordinary annual appropriation, and 4 destroyers (1850 tons) and 16 destroyers (1500 tons) authorised, and contracts placed, under the National Industrial Recovery Act (1933).

(b) Includes "Albatross," seaplane carrier, and "Ark Royal," aircraft tender. The latter is used for experimental work.

(c) Includes "Notoro" and "Kamoi," seaplane carriers.

(d) Includes "Commandant Teste," aviation transport, a special type under the terms of the London Naval Treaty.

(e) "Miraglia," seaplane carrier.

(f) Cruiser minelayers are not included in these totals.

(g) One 8-in. cruiser is authorised, and contract placed, under the National Industrial Recovery Act (1933), but may not be laid down until January 1, 1934. The other cruiser may not be laid down before 1935. Five more cruisers are projected but may not be built until the expiry of the London Naval Treaty.

(h) In addition there are 7 old cruisers classed as coast defence vessels, 1st class.

(i) In addition there is an old cruiser classed as coast defence vessel, 2nd class.

(j) Excluding "Centaur" on the sale list.

(k) Includes the old cruiser "F. Ferruccio," and also 3 armoured cruisers classified as battleships, 2nd class, in Italian official lists.

(l) 1933 programme.

(m) Includes the old cruiser "Rochester," listed for disposal.

(n) Includes the old cruiser "Gueydon."

(o) Includes destroyers equipped as targets, etc. In addition to this total there are 12 destroyers fitted as minelayers, and 16 operated by the U.S. Coast Guard.

(p) 4 torpedo boats also building.

(q) 6 destroyers are projected.

(r) There are 4 first class torpedo boats in addition.

(s) There are four torpedo boats in addition.

(t) There are 9 torpedo boats in addition and 5 torpedo boats are projected to commence in 1936.

(u) 4 destroyers are projected to commence in 1934.

(v) 4 submarines are projected.

(w) Includes vessels under French protection at Bizerta.

(y) Exact number uncertain—many of these are at present of no fighting value.

(z) Authorised, and contracts placed, under the National Industrial Recovery Act (1933).

TABLE II.—BATTLESHIPS WITH 14-IN. GUNS AND UPWARDS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.
		tons.			tons.			tons.												
1925	Nelson	33,500	1921	Colorado	32,500	1920	Mutsu	32,720												
1925	Rodney	33,900	1921	West Virginia	31,800	1919	Nagato													
1915	Malaya		1920	Maryland	31,500	1917	Hyuga	29,990												
1914	Valiant		1919	Tennessee	32,300	1916	Ise													
1914	Barham	31,100	1919	California	32,600	1915	Yamashiro	29,330												
1913	Queen Elizabeth		1917	Idaho †	30,800	1914	Fuso													
1913	Warspite		1917	New Mexico †	30,000	1913	Kirishima													
1915	Royal Sovereign		1917	Mississippi †	30,100	1913	Haruna	29,330												
1914	Royal Oak		1915	Arizona	32,600	1912	Kongo													
1915	Revenge	29,150	1915	Pennsylvania	32,100															
1915	Resolution		1914	Oklahoma	29,000															
1916	Ramillies		1914	Nevada	29,000															
			1912	Texas	27,000															
			1912	New York																
	12 ships.	368,650		14 ships.	428,300		9 ships.	272,070												

TABLE III.—BATTLE-CRUISERS WITH 14-IN. GUNS AND UPWARDS.

BRITISH EMPIRE.			UNITED STATES.			* JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standar Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.
		tons.						tons.												
1918	Hood	42,100																		
1916	Renown	32,000																		
1916	Repulse																			
	3 ships.	106,100																		

* Hiyei (Japan) is retained as a training ship in accordance with London Naval Treaty.
† The displacement of these ships will be increased by about 3000 tons during present modification.

TABLE IV.—BATTLESHIPS WITH GUNS BELOW 14-IN.

BRITISH EMPIRE.*			UNITED STATES.*			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Normal Displacement.	Launched.	Name.	Normal Displacement.
					tons.						tons.			tons.			tons.			tons.
			1911	Arkansas	26,100				1913	Bretagne	22,189	1913	Andrea Doria	21,554	1914	General Alexieff †	22,600	1905	Hannover ..	13,040
									1913	Lorraine...		1913	Caio Duilio ...		1911	Paris Commune	23,000	1906	Schleswig-Holstein	
									1913	Provence		1911	Conte di Cavour	21,604	1911	Marat ...		1906	Schlesien ...	
									1911	Courbet ...		1911	Giulio Cesare	21,810	1911	Krasni Leningrad		1903	Hessen ...	12,988
									1911	Jean Bart					1911	October Revolution		1931	Deutschland	10,000 (standard)
									1912	Paris ...										62,108
									1909	Diderot ...	17,597									
									1909	Condorcet										
									1909	Voltaire...									*Building:—*	
										Building:— Dunkerque	26,500							1933	*Admiral Scheer*	10,000 (standard)
																		—	*Ersatz Braunschweig*	
				1 ship.	26,100					10 ships, including 1 building	212,425		4 ships.	86,522		5 ships.	114,600		7 ships, including 2 building	

* See note (*) below. † Under French protection at Bizerta.

TABLE V.—BATTLE-CRUISERS WITH GUNS BELOW 14-IN.

BRITISH EMPIRE.†			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.

* Emperor of India and Marlborough (Great Britain) and Florida and Utah (United States) were disposed of in 1931 in accordance with the London Naval Treaty, and Iron Duke (Great Britain) and Wyoming (United States) were retained as training ships.

† Tiger was disposed of in 1931 in accordance with the London Naval Treaty.

TABLE VI.—CRUISERS,

Cruisers marked * have guns above 6·1-in.

BRITISH EMPIRE.

Speed.	Name.	Standard Displacement.
kts.		tons.
32½	London * ...	9,750
32½	Devonshire * ...	
32½	Shropshire * ...	9,730
32½	Sussex * ...	
31½	Berwick * ...	9,750
31½	Cornwall * ...	9,750
31½	Kent *	9,850
31½	Suffolk * ...	9,800
31½	Cumberland *	9,750
31½	Australia (A) *	9,870
31½	Canberra (A) *	9,850
33	Emerald ...	7,550
33	Enterprise ...	7,580
30½	Effingham * ...	9,770
30½	Frobisher * ...	9,860
29½	Hawkins * ...	9,800
29	Despatch ...	
29	Diomede (N.Z.)	
29	Durban	
29	Delhi	
29	Dunedin (N.Z.)	4,850
29	Danae	
29	Dauntless ...	
29	Dragon	
29	Capetown ...	
29	Cairo	
29	Calcutta	4,200
29	Carlisle	
29	Colombo... ...	
29	Cardiff	
29	Coventry ...	
29	Curlew	4,290
29	Ceres	
29	Curacoa	
29	Caledon	
29	Calypso	4,180
29	Caradoc ...	

UNITED STATES.

Speed.	Name.	Standard Displacement.
kts.		tons.
	Omaha ...	
	Milwaukee	
	Cincinnati ...	
	Raleigh ...	
33·7	Detroit ...	7,050
	Richmond ...	
	Concord ...	
	Trenton ...	
	Marblehead	
	Memphis ...	
21	Rochester ‡*	8,150
32½	Salt Lake City * ...	9,100
32½	Pensacola *	
32	Northampton * ...	9,050
	Chester * ...	9,200
	Louisville *	9,050
32½	Chicago * ...	9,300
	Houston * ...	9.050
	Augusta * ...	9,050
	Portland * ...	9,800
	Indianapolis * ...	9,950
32½	New Orleans *	10,000 (estimated)
	Astoria * ...	
	Minneapolis *	
32½	*Tuscaloosa* *	10,000 (estimated)
	San Francisco *	
	Quincy * ...	
	Three in no. authorised (may be laid down 1933–5).	

JAPAN.

Speed.	Name.	Standard Displacement.
kts.		tons.
33	Nachi * ...	
33	Myoko * ...	10,000
33	Ashigara * ...	
33	Haguro * ...	
33	Kako * ...	
33	Furutaka *	7,100
33	Kinugasa *	
33	Aoba * ...	
33	Naka	
33	Sendai ...	5,195
33	Jintzu ...	
33	Nagara ...	
33	Kinu	
33	Abukuma ...	5,170
33	Natori ...	
33	Isudzu ...	
33	Yura	
33	Kuma... ...	
33	Tama	
33	Kitakami ...	5,100
33	Kiso	
33	Oi	
33	Yubari ...	2,890
31	Tenryu ...	3,230
31	Tatsuta ...	
26	Yahagi ...	4,400
26	Hirado ...	
33	Takao * ...	
33	Atago * ...	9,850
33	Chokai * ...	
33	Maya * ...	
—	*Mogami* ...	8,500
—	*Mikuma* ...	

FRANCE.

Speed.	Name.	Standard Displacement.
kts.		tons.
33·2	Tourville * ...	10,000
	Duquesne * ...	
32	Suffren *	10,000
33	Duguay-Trouin	
33	La Motte Picquet	7,249
33	Primauguet ...	
27	Metz ... ... (ex-Konigsberg)	5,264
26	Strasbourg ... (ex-Regensburg)	4,723
27	Thionville... ... (ex-Novara)	2,922
23	Waldeck Rousseau *	12,617
23	Ernest Renan *	12,234
22·8	Jules Michelet *	11,072
32	Colbert *	
32	Foch *	10,000
32	Dupleix	
26	Jeanne d'Arc ...	6,496
31	*Algerie* *	10,000
31	*La Galissonnière*	7,600
31	*Jean de Vienne*	
31	*Gloire*	
31	*Marseillaise* ...	7,600
31	*Montcalm*	
31	*Georges Leygues (formerly named Chateaurenault)*	

ITALY.

Speed.	Name.	Standard Displacement.
kts.		tons.
35	Trento * ...	10,000
35	Trieste * ...	
27	Taranto	3,184
28	Quarto	2,903
27¼	Ancona	3,838
27¼	Bari	3,248
27	Brindisi	2,756
27	Venezia	
22	Libia...	3,700
22¼	San Giorgio * ...	9,232
23	San Marco * ...	9,350
27½	Pisa *	8,759
37	Alberto da Guissano	
37	Alberico di Barbiano	5,069
37	Bartolomeo Colleoni	
37	Giov. della Bande Nere	
32	Zara *	10,000
32	Fiume *	
32	Gorizia *	10,000
37	Armando Diaz	5,008
37	Luigi Cadorna	
32	Pola *	10,000
36	Bolzano * ...	10,000
37	*Montecuccoli* ..	5,857
37	*Attendolo*	
—	*Eugenio di Savoia*	6,691
—	*Duca d'Aosta*	
	Filiberto Duca degli Abbruzzi	7,000
—	*Guiseppe Garibaldi*	

SOVIET UNION.

Speed.	Name.	Normal Displacement.
kts.		tons.
29½	Profintern ...	7,600
29½	Chevonaya-Ukrainia	7,600
23	General Kornilov †	6,675
23	Komintern	6,675
19	Almaz † ...	3,300
20	Aurora ...	6,730
29½	Krasni Kavkas ...	7,600
25	Voroshilov	7,600
—	*Admiral Istomin*	7,600
—	*Admiral Kornilov*	

GERMANY.

Speed.	Name.	Standard Displacement.
kts.		tons.
29	Emden ...	6,000
32	Königsberg	
32	Karlsruhe ...	6,000
32	Köln	
32	Leipzig ...	6,000
22	Berlin	3,592 (normal)

(A) Australian Navy. (N.Z.) New Zealand Navy. † Under French protection a Bizerta. ‡ Listed for disposal.

Table VI.—Cruisers (*continued*).

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Normal Displacement.	Speed.	Name.	Displacement.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.
29	Concord§ ...	4,120		*One 8" cruiser (Vincennes) and four 6" cruisers (Savannah, Nashville, Brooklyn and Philadelphia) are authorised and contracts placed under the National Industrial Recovery Act* (1933). *"Vincennes" may not be laid down until January*, 1934. *An 8" cruiser is authorised which may not be laid down until January*, 1935.																
29	Cambrian ...	3,920 (Cambrian to Champion)																		
29	Canterbury ...																			
29	Constance ...																			
29	Castor																			
29	Champion ...																			
29	Comus	3,895																		
30	Vindictive* ...	9,996																		
25½	Adelaide (A)...	5,100																		
25½	Brisbane (A)...	5,120																		
32¼	Norfolk* ...	9,850																		
32¼	Dorsetshire* ...	9,900																		
32¼	York*	8,250																		
32	Exeter*	8,390																		
32½	Leander	7,000																		
32½	Achilles	7,000																		
32½	*Neptune* ...	7,000																		
32½	*Orion*	7,000																		
	Ajax	7,000																		
	Amphion ...	7,000																		
	Apollo	7,000																		
	Phaeton	7,000																		
	Arethusa ...	5,200																		
	Galatea	5,200																		
	Authorised:—(1933 programme). Two cruisers of a new type of about 9000 tons, and one of the "Arethusa" type.																			
	† 61 ships, including 8 building (and 3 authorised).	396,551		27 ships, including 5 building (and 6 authorised).	231,300		‡ 33 ships, including 2 building (and 2 authorised).	215,055		‡ 23 ships, including 7 building.	192,675		‡ 29 ships, including 6 building.	189,114		10 ships, including 2 building.	68,980		6 ships.	33,592

(A) Australian Navy.

† One cruiser minelayer (Adventure, 6740 tons) in addition.

NOTE.—Vessels of which the names are printed in italics are under construction.

‡ A number of old cruisers are not included in the above lists, viz. Japan, 8 (classed as coast defence vessels); France, 1 (Gueydon); Italy, 1 (F. Ferruccio).

§ Centaur of this class is on the sale list.

TABLE VII.—AIRCRAFT AND SEAPLANE CARRIERS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.
		tons.			tons.			tons.			tons.			tons.						
1916	Furious ...	22,450	1912	Langley** ...	11,500	1920	Notoro ‡	14,050	1920	Béarn † ...	22,146	1923	Miraglia‡‡	4,891						
1917	Argus ...	14,450	1925	Lexington *...	} 33,000	1922	Kamoi ‡	19,550	1929	Commandant Teste ††	10,000									
1917	Ark Royal‖	6,900	1925	Saratoga * ...		1921	Hosho ...	7,470												
1914	Hermes ...	10,850				1925	Akagi *	26,900												
1919	Eagle † *	22,600	1933	*Ranger* ...	13,800	1921	Kaga †	26,900												
1918	Courageous	22,500				1931	Ryujo	7,600												
1928	Albatross (A)	4,800		*Contracts placed 1933 under the National Industrial Recovery Act for aircraft carriers Yorktown and Enterprise (about 20,000 tons).*																
1916	Glorious *	22,500																		
	8 ships.	127,050		4 ships (including 1 building) and 2 authorised.	91,300		6 ships.	102,470		2 ships.	32,146		1 ship.	4,891		Nil	—		Nil	—

* Designed as battle-cruisers; converted to aircraft-carriers under the Washington Treaty. ‡ Seaplane carriers converted from an oiler.
† Designed as battleships ‖ Seaplane carrier, used for experimental work. Not counted as part of the war fleet, under the terms of the London Naval Treaty.
** Converted from collier Jupiter in 1921. (A) Seaplane carrier, Australian Navy.
†† Aviation transport, a special type under the terms of London Naval Treaty. ‡‡ Seaplane carrier.

NOTE.—Vessels of which the names are printed in italics are under construction.

BRITISH AND FOREIGN
ORDNANCE TABLES

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS.

Tables Corrected by the Manufacturers, November, 1933.

NAVAL GUNS AND MOUNTINGS.

	40 mm. 2-pdr.	40 mm. 2·2-pdr.	47 mm. 3-pdr.	57 mm. 6-pdr.	4-in. 101·6 mm.	4-in. 101·6 mm.	4·7-in. 120 mm.	4·7-in. 120 mm.	5·118-in. 130 mm.	5·5-in. 139·7 mm.	5·906-in. 150 mm.
System	Auto.	Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.
Diameter of Bore ins.	1·575	1·575	1·85	2·244	4	4	4·724	4·724	5·118	5·5	5·906
do. do. mm.	40	40	47	57	101·6	101·6	120	120	130	139·7	150
Length of Bore cals.	39·37	50	50	50	45	50	45	50	52	50	50
Weight of Gun	lb. 590	lb. 1,433	c. q. lb. 5 3 14	c. q. 9 1	c. q. 36 0	c. q. 40 0	t. c. 2 19	t. c. q. 3 6 3	t. c. 4 8	t. c. 4 13	t. c. 7 4
do. do. kg.	268	650	298	470	1,830	2,032	3,000	3,391	4,470	4,740	7,315
Weight of Projectile lb.	2	2·2	3·3	6	31	31	48·5	48·5	68	79·37	100
do. do. kg.	0·91	1	1·5	2·72	14·06	14·06	22·0	22	30·85	36	45·4
Muzzle Velocity f.s.	2,000	2,625	2,800	2,600	2,700	3,000	2,789	3,000	3,000	3,000	2,940
do. do. m.s.	600	800	853	792	823	914	850	915	915	914	896
Muzzle Energy f.t.	54	105	180	280	1,565	1,935	2,616	3,025	4,245	4,953	5,995
do. do. m.t.	17·0	32	55·75	86·7	485	600	810	935	1,315	1,535	1,857
Penetration (W.I. at muzzle). ins.	..	..	6·7	7·5	13·6	16	16·6	18·0	20	22	23
do. mm.	..	..	170	190	345	405	420	460	510	560	585
Rounds per Minute	200	100—130	30	28	18	15	12	12	..	..	..
Weight of Mounting and Shield	lb. 1,676	lb. 2,128	c. q. lb. 11 1 23	c. q. lb. 17 3 10	t. c. q. 2 18 3	t. c. q. 3 5 1	t. c. q. 4 19 3	t. c. q. 7 15 1	t. c. q. lb. 9 0 1 0	t. c. q. lb. 9 2 0 0	t. c. q. lb. 14 5 3 0
do. do. do. kg.	760	965	586	906	2,985	3,315	5,067	7,887	9,158	9,246	14,517
Weight of Shield	..	..	c. q. lb. 1 0 20	c. q. lb. 1 2 10	c. q. lb. 7 2 0	c. q. lb. 14 1 13	c. q. lb. 7 3 0	c. q. lb. 18 3 21	c. q. lb. 19 0 0	t. c. q. lb. 1 2 0 0	t. c. q. lb. 3 4 0 0
do. do. kg.	..	..	60	80	380	730	394	962	965	1,188	3,250
Thickness of Shield ins.	..	..	·22	·25	·144	·25	·144	·144	·144	·1875	·625 & ·375
do. do. mm.	..	..	5·6	6·35	3·65	6·35	3·65	3·65	3·65	4·76	16 & 9·5
Angle of Elevation deg.	85	90	20	20	30	30	35	45	45	35	45
Angle of Depression deg.	5	5	20	10	10	10	10	10	10	10	10

The above guns are of all-steel construction. Guns of steel and wire construction are manufactured for some of the above having approximately the same characteristics.

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS. NAVAL GUNS AND MOUNTINGS—*continued.*

		6-in. 152 mm.	6-in. 152 mm.	8-in. 203 mm.	8-in. 203 mm.	8-in. 203 mm.	9·2-in. 234 mm.	10-in. 254 mm.	12-in. 305 mm.	13·5-in. 343 mm.	14 in. 356 mm.	15-in. 381 mm.	16-in. 406 mm.
Diameter of Bore	ins.	6	6	8	8	8	9·2	10	12	13·5	14	15	16
do. do.	mm.	152·4	152·4	203·2	203·2	203·2	233·7	254	304·8	342·9	355·6	381	406·2
Length of Bore	cals.	45	50	45	50	55	50	50	50	45	50	45	45
		t. c.	t. c. q.	t. c.	t. c.	t. c.	t. c. q.	t. c.	t. c.	t. c.	t. c.	t. c.	t. c.
Weight of Gun		6 10	6 17 2	14 0	15 14	16 10	28 16 2	26 1	43 10	66 0	80 0	87 0	105 0
do. do.	kg.	6,605	6,985	14,224	15,940	16,765	29,290	26,470	44,200	67,060	81,284	88,400	106,685
Weight of Projectile	lb.	100	100	250	256	256	380	500	850	1,400	1,560	1,951	2,000
do. do.	kg.	45·4	45·4	113·4	116·0	116·0	172·37	226·8	385·6	635	707·6	885	907·2
Muzzle Velocity	f.s.	2,850	3,000	2,845	3,000	3,150	3,000	2,933	2,933	2,500	2,475	2,500	2,650
do. do.	m.s.	869	915	867	914	960	914	894	894	762	754	760	808
Muzzle Energy	f.t.	5,630	6,240	14,030	15,976	17,615	23,714	29,825	50,705	60,675	66,260	84,550	97,390
do. do.	m.t.	1,745	1,930	4,345	4,950	5,445	7,340	9,235	15,705	18,790	20,520	26,185	30,160
Penetration (W.I. at muzzle)	ins.	22	24	31	34·5	38	38·8	41·7	50·3	51·5	51·65	55	59
do.	mm.	560	610	785	875	965	985	1,060	1,280	1,310	1,310	1,400	1,500
Rounds per Minute		10	..	5	6	6	4	3	2	1·5	1·5	..	1·2
		t. c. q.	t. c. q. lb.	t. c.	t. c.	t. c.	t.	t.	t.	t.	t.	t.	t.
Weight of Mounting and Shield		12 9 2	12 1 0 0	144 10	147 10	149 10	257	287	431	558	588	844	1,270
do. do. do.	kg.	12,675	12,245	146,800	150,000	152,000	261,100	291,600	438,000	567,000	597,500	857,500	1,290,000
		t. c. q. lb.	t. c. q. lb	t.	t.	t.	t.	t.	t.	t.	t.	t.	t.
Weight of Shield		4 4 3 16	3 4 0 0	24	24	24	102	115	150	192	191	315	670
do. do.	kg.	4,315	3,250	24,400	24,400	24,400	103,600	117,000	153,400	195,100	194,000	320,000	680,700
Thickness of Shield	ins.	1·5 & 1	·625 & ·375	1 & ·75	1 & ·75	1 & ·75	8, 7, 3 & 2	6, 4 & 1·5	13, 11 & 3	11, 4 & 3	10, 9 & 3	15, 12, 11 & 5	15, 11, 8, 4 & 3
do. do.	mm.	38 & 25·4	16 & 9·5	25 & 20	25 & 20	25 & 20	203, 178, 75 & 50	152, 102, & 38	330, 280, & 75	280, 102, & 75	254, 230, & 75	381, 305, 280, 127	381, 280, 203, 102 & 75
Angle of Elevation	deg.	30	35	70	70	70	15	40	15	20	25	30	40
Angle of Depression	deg.	5	10	3	3	3	5	5	5	5	5	5	5

The above guns are of all-steel construction. Guns of steel and wire construction are manufactured for some of the above having approximately the same characteristics.

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS. HOWITZERS AND FIELD GUNS.

		2·953-in. 75 mm. Field.	2·953-in. 75 mm. Field.	4·134-in. 105 mm. Field Howr.	4·134-in. 105 mm. Field.	4·134-in. 105 mm. Field.	5-in. 127 mm. Field.	5·9-in. 150 mm. Howr.	6-in. 152 mm. Field.	8-in. 203 mm. Railway.	8·268-in. 210 mm. Semi-Mobile.	12-in. 305 mm. Railway.	15-in. 381 mm. Railway.
Diameter of Bore	ins.	2·953	2·953	4·134	4·134	4·134	5	5·9	6	8	8·268	12	15
do. do.	mm.	75	75	105	105	105	127	150	152	203	210	305	381
Length of Bore	cals.	30	40	21	26	45	41	21	45	50	40	50	45
Weight of Gun		c. q. 7 3	c. q. 11 3	c. q. 11 2	c. q. 12 0	t. c. q. 1 13 0	t. c. q. 2 11 2	t. c. q. 1 11 0	t. c. q. 5 12 1	t. c. 15 5	t. c. 10 19	t. c. 43 10	t. c. 87 0
do. do.	kg.	394	597	584	610	1,675	2,615	1,575	5,700	15,500	11,125	44,200	88,400
Weight of Projectile	lb.	14·33	14·33	26·45	33·07	35·27	56	90·4	100	256	286·6	850	1,951
do. do.	kg.	6·5	6·5	12·0	15·0	16·0	25·5	41·0	45·4	116	130	385·6	885
Muzzle Velocity	f.s.	1,952	2,461	1,608	2,000	2,690	2,700	1,903	2,870	2,900	2,608	2,933	2,500
do. do.	m.s.	595	750	490	610	820	823	580	875	884	795	894	760
Muzzle Energy	f.t.	379	602	474	915	1,770	2,830	2,270	5,730	14,930	13,515	50,705	84,550
do. do.	m.t.	117	186	147	284	548	877	703	1,774	4,625	4,185	15,705	26,185
Rounds per Minute		25	..	10	10	..	..	4	4	4	3	5 in 2 mins.	2
Weight of Mounting and Shield		t. c. q. lb. 1 1 1 25	t. c. 1 4	c. q. lb. 19 1 16	t. c. q. lb. 1 0 2 0	t. c. 2 19	..	t. c. q. lb. 3 10 3 0	t. c. q. lb. 7 13 3 20	t. c. 62 8	tons 28	tons 175	tons 275
do. do. do.	kg.	1,091	1,219	985	1,498	2,997	..	3,594	7,820	63,400	28,450	177,800	279,400
Weight of Shield		c. q. lb. 1 2 10	..	c. q. lb. 1 2 24	c. q. lb. 0 3 0	No Shield	..	No Shield	No Shield	No Shield	No Shield	No Shield	No Shield
do. do.	kg.	80·7	..	87	38	..	..	..	..	..	..	..	..
Thickness of Shield	ins.	·116	..	·125	·16	..	..	..	..	..	..	..	..
do. do.	mm.	2·9	..	3·2	4·06	..	..	..	..	..	..	..	..
Angle of Elevation	deg.	40	45	40	45	45	..	45	45	50	50	35½	40
Angle of Depression	deg.	5	8	5	5	0	..	0	5	0	2	0	0

		Tank Guns.		For Vickers Carden Loyd Vehicle.		Mountain Howitzers.		Landing Gun.
		57-mm. 6-pdr. Semi-Auto.	47-mm. 3-pdr. Semi-Auto.	47 mm. 3-pdr.		2·953-in. (75 mm.) Jointed.	4·134-in. (105 mm.) Jointed.	3-in. (76·2 mm.)
Diameter of Bore	ins.	2·244	1·85	1·85		2·953	4·134	3
do. do.	mm.	57	47	47		75	105	76·2
Length of Bore	cals.	27	35	21		18	11	22
Weight of Gun		c. q. lb. 2 0 5	c. q. lb. 2 2 0	lb. 165		c. q. lb. 3 2 4	c. q. lb. 5 0 0	c. q. lb. 3 3 4
do. do.	kg.	120	127	74·8		179·8	254	192
Weight of Projectile	lb.	6	3·3	3·3		14·33	26·45	12·5
do. do.	kg.	2·72	1·5	1·5		6·5	12	5·67
				A.P. Shell.	H.E. Shell.			
Muzzle Velocity	f.s.	1,200	1,854	1,600	984	1,450	1,148	1,640
do. do.	m.s.	366	565	488	300	442	350	500
Muzzle Energy	f.t.	60	79	58·6	22·2	210	242	233
do. do.	m.t.	18·6	24·5	18·1	6·9	65·0	74·5	72·0
Rounds per Minute		..	..			18	10	25
Weight of Mounting and Shield		c. q. lb. 2 3 21	c. q. lb. 2 2 0			c. q. lb. 11 0 0	c. q. lb. 11 1 21	c. q. lb. 10 0 0
do. do. do.	kg.	149	127			589	581	508
Weight of Shield		..	..			c. q. lb. 1 2 27	c. q. lb. 1 2 10	c. q. lb. 1 1 15
do. do.	kg.	..	..			88	81	70
Thickness of Shield	ins.	..	..			·16	·16	·192
do. do.	mm.	..	..			4·0	4·0	4·875
Angle of Elevation	deg.	30	30			45	45	23
Angle of Depression	deg.	10	10			5	5	10

		44–60 mm.			47 mm.			65 mm.			70 mm. with 25·4 mm. S.C. Tube, on Platform Carriage.	
		44 mm. Barrel.		60 mm. Barrel.	Armour-Piercing Ammunition.		High-Explosive Ammunition.		High Explosive Ammunition.		70 mm. Barrel.	25·4 mm. S.C. Tube.
Diameter of Bore	ins.	1·73		2·36		1·85			2·559		2·756	1·0
do. do.	mm.	44		60		47			65		70	25·4
Length of Bore	cals.	30		20		20			16		15	50
		Barrel.	Breech Ring.	Breech Mechanism.	Barrel.	Breech Ring.	Breech Mechanism.	Barrel.	Breech Ring.	Breech Mechanism.	Gun and Mechanism.	S.C. Tube.
Weight of Gun		75 lb.	50 lb.	26 lb.	78 lb.	55 lb.	31 lb.	88 lb.	62 lb.	38 lb.	172 lb.	56·5 lb.
do. do.	kg.	34	22·7	11·8	35·4	25	14	38	28	17	78	25·6
Weight of Projectile	lb.	2·75		5·5	3·3		3·3		8·8		8·8	0·55
do. do.	kg.	1·25		2·5	1·5		1·5		4		4	0·25
Muzzle Velocity	f.s.	1,706		732	1,600		755		820		700	2461
do. do.	m.s.	520		223	488		230		250		213	750
Muzzle Energy	f.t.	55·5		20·4	58·6		13·0		41·0		30	23·1
do. do.	m.t.	17·2		6·3	18		4		12·7		9·3	7·15
Weight of Mounting and Shield	lb.		326			397			556		558 with Platform and S.C. Tube	
do. do. do.	kg.		148			180			252		253 „ „ „ „ „	
Weight of Shield	lb.		—			45			106			
do. do.	kg.		..			20·4			48			
Thickness of Shield	ins.		..			0·14			0·16			
do. do.	mm.		..			3·5			4			
		44 mm. Barrel.		60 mm. Barrel.	Low Position.		High Position.	Low Position.		High Position.		
Angle of Elevation	deg.	10		20 to 60	15		45	20		45	45	15 Nominal
Angle of Depression	deg.	5		0	10		2½	10		2½	10	10

Vickers-Armstrongs Limited—Guns and Mountings. Guns Mounted on Aircraft.

		* ·303-in. (7·7 mm.) Observer's gun.	*·303-in. (7·7 mm.) Observer's gun.	*·303-in. (7·7 mm.) Pilot's gun.	·5-in. (12·7 mm.) Observer's gun.	·5-in. (12·7 mm.) Pilot's gun.	·5-in. (12·7 mm.) Observer's Gun.	1·457-in. (37 mm.) Observer's gun.	1·575-in. (40 mm.) Observer's gun.
System		Vickers-Berthier Gas operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers-Armstrongs Gas operated.	Vickers-Armstrongs Recoil operated.	Vickers Semi-Auto. operated.
Diameter of Bore	ins.	·303	·303	·303	·5	·5	·5	1·457	1·575
do. do.	mm.	7·7	7·7	7·7	12·7	12·7	12·7	37	40
Length of Bore	cals.	72	79·2	93·7	50	62·2	72	39·5	40
Weight of Gun	lb.	18·25	25	26·5	45	52·5	70	200	234
do. do.	kg.	8·27	11·3	12	20·4	23·8	32	90·72	106
Weight of projectile	lb.	174 grs.	174 grs.	174 grs.	565 grs.	565 grs.	785 grs.	1·457	2
do. do.	kg.	11·3 grms.	11·3 grms.	11·3 grms.	36·6 grms.	36·6 grms.	51 grms.	0·666	0·91
Muzzle Velocity	f.s.	2,400	2,400	2,440	2,450	2,550	2,450	1050	2,300
do. do.	m.s.	732	732	744	746	777	747	594	700
Muzzle Energy	f.t.	0·9	0·9	1	3·36	3·64	4·7	40·2	73
do. do.	m.t.	0·28	0·28	0·31	1·04	1·125	1·4	12·45	22·6
Rounds per Minute		700–750	650–750	900–1000	350–650	350–650	400–450	100	..
Weight of Mounting	lb.	5	..	..	..	..	..	102	432
do. do.	kg.	0·9	..	..	..	..	..	46	196
Angle of Elevation	deg.	90	..	..	..	..	..	55	60
Angle of Depression	deg.	90	..	..	..	..	..	40	30

Machine Guns—Anti-Aircraft.

		*·303-in. (7·7 mm.)	*·303 in. (7·7 mm.)	5-in. (12·7 m.)	·5-in. (12·7 mm.)	·5-in. (127· mm.)
System		Vickers Recoil operated.	Vickers-Berthier Gas operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers-Armstrongs Gas operated.
Diameter of Bore	ins.	·303	·303	·5	·5	·5
do. do.	mm.	7·7	7·7	12·7	12·7	12·7
Length of Bore	cals.	93·7	72	62·2	90	72
Weight of Gun	lb.	32	20·8	52·5	101	70
do. do.	kg.	14·5	9·4	23·8	40·6	32
Weight of Projectile	lb.	174 grs.	174 grs.	565 grs.	690 grs.	785 grs.
do. do.	kg.	11·3 grms.	11·3 grms.	36·6 grms.	44·7 grms.	51 grms.
Muzzle Velocity	f.s.	2,440	2,400	2,550	3,000	2450
do. do.	m.s.	744	732	777	914	747
Muzzle Energy	f.t.	1	0·9	3·64	6·15	4·7
do. do.	m.t.	·31	0·28	1·125	1·9	1·4
Rounds per minute		500–600	450–500	350–650	350–450	400–450

* This gun can be adapted to fire any pattern of rifle calibre ammunition.

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS. ANTI-AIRCRAFT GUNS.

	40-mm. 2-pdr.	40-mm. 2·2-pdr.	40-mm. 2·2-pdr.	47-mm. 3-pdr.	Mobile 75 mm. 40 Calibre	Mobile 75 mm. 46 Calibre	3-inch	3-inch	4-in.	4-in.	105 mm. 45 Calibre	4·7-in.
System	Auto.	Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Q.F.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.
Construction	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . ins.	1·575	1·575	1·575	1·85	2·953	2·953	3	3	4	4	4·134	4·724
" " . mm.	40	40	40	47	75	75	76·2	76·2	101·6	101·6	105	120
Length of bore . cals.	39·37	50	50	50	40	46	45	50	45	50	45	40
Weight of gun	lb. 590	lb. 1,433	c. q. lb. 2 0 17	c. q. lb. 5 3 14	c. q. lb. 11 0 0	c. q. lb. 13 1 8	c. q. lb. 18 1 0	t. c. q. 1 3 1	t. c. q. 1 16 1	t. c. q. 2 0 0	t. c. q. 2 1 2	t. c. q. 3 1 0
" " . kg.	268	650	109	298	560	677	927	1181	1842	2032	2,110	3,100
Weight of projectile lb.	2	2·2	2·205	3·3	14·33	14·33	12·5	14·33	31	31	35·274	48·5
" " . kg.	·91	1	1	1·5	6·5	6·5	5·6	6·5	14·06	14·06	16	22
Muzzle velocity . f.s.	2,000	2,625	2,625	2,800	2,461	2,641	2,600	2,560	2,700	2,850	2,625	2,560
" " . m.s.	600	800	800	853	750	805	792	780	823	869	800	780
Muzzle energy . f.t.	54	105	105	180	602	695	586	650	1,565	1,740	1,685	2,205
" " . m.t.	17	32	32	55·75	186	215	181	201	485	540	522	683
Rounds per minute .	200	100–130	35	30	..	..	20	25	18	18	..	12
Weight of mounting (exclusive of Gun) .	c. q. lb. 14 3 24	c. q. lb. 19 0 0	c. q. 12 3	c. q. lb. 18 2 3	t. c. q. 2 1 3	t. c. q. 2 2 3	t. c. q. lb. 1 19 3 9	t. c. q. 2 18 2	t. c. q. lb. 6 14 0 18	t. c. q. lb. 6 12 0 0	t. c. q. 5 11 1	t. c. q. lb. 9 0 1 0
" " . kg.	760	965	647·6	941·1	2,121	2,172	2023·4	2425·8	6815	6706·0	5,660	9157·1
Angle of elevation . deg.	85	90	90	80	90	90	90	90	90	90	90	90
Angle of depression deg.	5	5	0	5	0	0	5	5	5	5	5	5

		*·303-in. (7·7-mm.) Observer's Gun for Aircraft.	*·303-in. (7·7-mm.) Pilot's Gun for Aircraft.	*·303-in. (7·7-mm.) Land and Naval.	*·303-in. (7·7-mm.) Observer's Gun for Aircraft.	*·303-in. (7·7-mm.) for Infantry.	·5-in. (12·7-mm.) Observer's Gun for Aircraft.	·5-in. (12·7-mm.) Pilot's Gun for Aircraft.	·5-in. (12·7-mm.) Land and Naval.	·5-in. (12·7-mm.) Land and Naval.	·5-in. (12·7-mm.) Observer's Gun for Aircraft.	·5-in. (12·7-mm.) for Anti-Aircraft and Anti-Tank.	1·457-in. (37-mm.) Observer's Gun for Aircraft.	1·575-in. (40-mm.) 2-pr. Anti-Aircraft.	1·575-in. (40-mm.) 2·2-pr. Anti-Aircraft.
System		Vickers Recoil operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers-Berthier Gas operated.	Vickers-Berthier Gas operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers Recoil operated	Vickers Recoil operated.	Vickers-Arm-strongs Gas operated.	Vickers-Arm-strongs Gas operated.	Vickers-Arm-strongs Recoil operated.	Vickers Recoil operated.	Vickers Recoil operated
Diameter of Bore .	ins.	·303	·303	·303	·303	·303	·5	·5	·5	·5	·5	·5	1·457	1·575	1·575
do. do. .	mm.	7·7	7·7	7·7	7·7	7·7	12·7	12·7	12·7	12·7	12·7	12·7	37	40	40
Length of Bore . .	cals.	79·2	93·7	93·7	72	72	50	62·2	62·2	90	72	72	39·5	39·37	50
Weight of Gun . .	lb.	25	26·5	32	18·25	20·8	45	52·5	52·5	101	70	70	200	590	1,433
do. do. . .	kg.	11·3	12	14·5	8·27	9·4	20·4	23·8	23·8	40·6	32	32	90·72	268	650
Weight of Projectile .	grs.	174	174	174	174	174	565	565	565	690	785	785	1·457	2 lb.	2·2 lb.
do. do. .	grms.	11·3	11·3	11·3	11·3	11·3	36·6	36·6	36·6	44·7	51	51	0·666	·91 kg.	1 kg.
Muzzle Velocity . .	f.s.	2,400	2,440	2,440	2,400	2,400	2,450	2,550	2,550	3,000	2,450	2,450	1950	2,000	2625
do. do. . .	m.s.	732	744	744	732	732	746	777	777	914	747	747	594	600	800
Muzzle energy . .	f.t.	0·9	1	1	0·9	0·9	3·36	3·64	3·64	6·15	4·7	4·7	40·2	54	105
do. do. . .	m t.	0·28	0·31	0·31	0·28	0·28	1·04	1·125	1·125	1·9	1·4	1·4	12·45	17	32
Rounds per minute . . .		650–750	900–1000	500–600	700–750	450–500	350–650	350–650	350–650	350–450	400–450	400–450	100	200	100–130
Weight of Mounting .	lb.	. .	. .	. .	5	. .	. .	. .	. .	. .	. .	. .	102	1,676	2,128
do. do. .	kg.	. .	. .	. .	·9	. .	. .	. .	. .	. .	. .	. .	46	760	965
Angle of Elevation . . .		. .	. .	. .	90°	. .	. .	. .	. .	. .	. .	. .	55°	85°	90°
Angle of Depression . . .		. .	. .	. .	90°	. .	. .	. .	. .	. .	. .	. .	40°	5°	5°

* This gun can be adapted to fire any pattern of rifle calibre cartridge.

BEARDMORE GUNS AND HOWITZERS.

NAVAL.

Calibre	ins.	4	4	4·7	4·7	4·7	5·5	5·5	5·5	6·0	6·0	7·5	8	8	9·2	12	13·5	15	16
do.	mm.	101·6	101·6	120	120	120	140	140	140	152	152	190	203·2	203·2	234	305	343	381	406
Length of Bore	cals.	50	55	50	45	52·5	55	55	40	50	52·5	45	50	55	50	50	46	45	45
Weight of Gun	tons	2·15	2·45	3·65	3·35	3·85	8·0	6·8	5·35	7·95	8·1	13·9	17·5	19·25	29	66	77	96	107
do. do.	kg.	2,184	2,489	3,711	3,405	3,911	8,128	6,910	5,435	8,077	8,230	14,122	17,780	18,542	24,402	67,056	78,232	97,536	108,712
Weight of Projectile	lbs.	31	31	50	50	48·5	92·6	82	75	100	100	200	250	250	425	950	1,350	1,850	2,100
do. do.	kg.	14·06	14·06	22·68	22·68	22	42	37·2	34	45·36	45·36	90·72	114·2	114·2	192·8	430·9	612·4	839·2	952·5
Muzzle Velocity	f.s.	2,920	3,000	2,950	2,650	3,000	2,950	3,000	2,650	2,970	3,000	2,750	2,900	3,000	2,825	2,825	2,650	2,620	2,675
do. do.	m.s.	890	914	900	808	914·4	900	914·4	808	905·2	914·4	838	884	914	861	861	808	799	815
Muzzle Energy	f.t.	1,833	1,935	3,017	2,434	3,026	5,587	5,117	3,652	6,116	6,240	10,488	14,579	15,602	23,518	52,571	63,738	88,056	104,198
do. do.	m.t.	568	599	934	837	937	1,730	1,584	1,131	1,894	1,938	3,248	4,515	4,832	7,283	16,280	20,441	27,270	32,270

		Motor Boats or Sub-marines.	Sub-marine.	ANTI-AIRCRAFT.							TANK GUNS.	
				For Sub-marines.	Fixed.	Fixed.	Fixed.	Fixed.	Mobile.			
Calibre	ins.	3·0	4·0	3·0	3·0	4·0	4·0	4·724	3·02	3·3	1·85	2·24
do.	mm.	75	101·6	75	75	101·6	101·6	120	77	84	47	57
Length of Bore	cals.	45	40	45	45	45	50	40	47·5	42·5	30·0	23
Weight of Gun	ton	0·67	1·3	0·64	1·65	1·95	2·1	3·1	0·75	1·1	1·8 cwt.	5·6 cwt.
do. do.	kg.	686	1,321	648	1,675	1,981	2,133	3,150	762	1,120	90·7	284
Weight of Projectile	lbs.	12·5	31	16	16	31	31	48·5	17·6	21	3·25	6
do. do.	kg.	5·67	14·06	7·26	7·26	14·06	14·06	22	8·0	9·53	1·49	2·72
Muzzle Velocity	f.s.	2,200	2,250	2,100	2,590	2,600	2,850	2,560	2,175	2,300	1,750	1,525
do. do.	m.s.	670	685·8	640	790	792	869	780	663	701	533	465
Muzzle Energy	f.t.	419	1,088	489	744	1,453	1,740	2,205	577	770	69	96·7
do. do.	m.t.	130	337	151	230	450	530	672	179	238	21·6	30

Semi-Auto.

		ANTI-TANK.			FIELD GUNS AND HOWITZERS.									
		Infantry Guns.			Gun.	How.	How.	How.	How.	Gun.	How.	How.	Mountain H.	
Calibre	ins.	1·85	1·575	2·24	3·3	4·134	3·3	4·5	6	6	8	9·2	3·3	
do.	mm.	47	40	57	84	105	84	112	152·4	152·4	203·2	234	84	
Length of Bore	cals.	28·5	37	24	31	20	15	20	13	35	17	17	12·25	
		cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	tons	tons	tons	tons	wts.	
Weight of Gun		1·03	0·92	0·92	7·25	8·0	4·28	9	1·15	3·7	3·0	4·25	4·0	
do. do.	kg.	52·4	46·7	46·7	369	406	194	458	1,168	3,759	3,048	4,318	203	
Weight of Projectile	lbs.	3·25	2·0	6·0	18·5	35·2	18·5	35		100	200	290	18·5	21·0
do. do.	kg.	1·49	0·91	2·72	8·39	16	8·39	15·88	45·36	45·36	90·72	131·5	8·39	9·53
Muzzle Velocity	f.s.	1,550	2,000	700	1,820	1,350	1,100	1,100	1,250	2,375	1,500	1,500	1,040	960
do. do.	m.s.	473	609·6	213·4	555	412	335	335·3	381	724	457	457	317	290
Muzzle Energy	f.t.	54	55	20·4	425	444	155	293·6	1,083	3,911	3,120	4,524	138	134
do. do.	m.t.	16·7	17	6·3	131	138	48	90·9	335	1,211	956	1,401	42·7	41·5
		S.A.	S.A.	S.A.										

In same carriage.

In same carriage.

FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1902.	Model 1902-06.	Model 1906.	Model 1906-10.	Model 1910.	Model 1912.	Model 1919.	Model 1920.	Model 1923.	Model 1924.	Model 1924.	Model 1927.
Calibre . . . cms.	19·4	24	30·5	30·5	13·8	34	13	15·5	13·8	13	20·3	13·8
Calibre . . ins.	7·64	9·45	12·01	12·01	5·43	13·4	5·12	6·1	5·43	5·12	7·99	5·43
Length . . . cals.	50	49·5	45	44·67	55	45	40	50	40	40	50	40
Total weight . tons	14·94	28·8	53·23	53·16	5·22	65·23	4·32	8·73	4·05	3·81	20·39	4·81
Firing Charge, A.P. Projectile . . lbs.	84·66	147·05	287·7	277·8	23 68	334	17·05	43·21	17·86	17·05	103·12	17·86
A.P. Projectile . lbs.	199·08	487·22	970·32	952·38	80·47	1222·44	70·44	124·07	87·98	70·44	271·61	87·98
Muzzle Velocity . f.-s.	3,117	2,625	2,559	2,569	2,723	2,605	2,408	2,789	2,297	2,408	2,789	2,297

ITALIAN NAVAL ORDNANCE.

Corrected to November, 1933.

Official Designation :— Calibre mm., length cal.	305/46	254/45	254/45	203/53	203/50	190/45	152/53	152/50	152/45	120/50	120/50	120/45	102/45	100/47	102/35	76/50	76/45	76/40	76/17
Mark A. = Armstrong, V = Vickers, An. = Ansaldo. S. = Schneider.	A., V.	A.	V.	An.	S.-An.	A., V.	An.	A.	S.	An.	A., V.	A.	S. A.		S.	A., V.	S.	A.	S.
Mark O.T.O. = Odero-Term-Orlando							O.T.O.							O.T.O.					
Date of introduction.	1909	1907	1906	1929	1924	1906	1927–29	1918	1911	1926	1909	1918	1917	1929	1914–1915	1909	1911	1916	1912
Designation by calibre, cm.	30·479	25·4	25·4	20·3	20·3	19·05	15·24	15·24	15·24	12·0	12·0	12·0	10·2	10·0	10·2	7·62	7·62	7·62	7·62
Calibre in inches . . .	12	10	10	8	8	7·5	6	6	6	4·75	4·75	4·75	4	3·9	4	3	3	3	3
Lengths: Total, in feet	47·77	39·07	38·715	36·646	34·593	29·22	27·83	25·94	23·42	19·57	20·38	18·38	15·715	15·721	12·247	13·271	11·722	10·292	4·593
Lengths: Rifled Bore, in inches .	477·9	358·4	370·5	358·66	—	281·7	—	256·6	219·2	—	204·64	174·64	150·74	12·365	114·29	126	107·2	101·57	44·8
Lengths: Powder Chamber in inches	97·7	74·91	74·91	64·56	—	51·65	—	44·6	44·6	—	28·64	35·03	27·16	3·112	23·50	22	25·4	—	—
Lengths: Bore in calibres . . .	37·3	35·84	37·05	—	—	37·5	—	42·77	36·54	—	43·31	36·96	37·53	15·371	28·46	42	35·73	28·42	14·96
No. of Grooves	72	60	70	52	52	44	44	36	56	36	36	36	40	26	32	28	25–8	16	24
Twist of Rifling, in calibres	30	30	00–30	—	30	00–30	30	33	36	30	30	30	—	30	—	30	35·9	33	22
Total Weight in tons . .	62·99	34·49	35·339	19·170	20·800	14·478	7·700	8·100	7·025	3·00	3·662	4·035	2·327	2·020	1·200	1·122	0·698	0·660	0·104
Firing Charge: Armour-piercing projectile . . . lb.	346	185	185	111·994	103·19	70·987	43	—	—	—	—	—	—	—	—	—	—	—	—
Firing Charge: Common Shell, H.E., lb.	279·9	185	185	—	—	70·987	—	32·79	30·64	—	14·66	9·589	9·479	10·319	6·50	3·02	3·571	2·281	0·529
Weight: Armour-piercing projectile . . . . . . lb.	997·2	494	494	275·573	260	200·39	103·5	—	—	50·5	—	—	—	—	—	—	—	—	—
Weight: Shell, H.E., lb. . . .	884·4	489·8	489·8	—	—	498·5	—	110·22	103·61	—	48·74	48·74	30·31	30·318	30·31	14·05	14·05	13·954	11·68
Weight: Shrapnel, . . . lb.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11·68
Bursting Charge: Armour-piercing projectile . . . lb.	16·63	4·37	4·37	—	—	2·332	—	—	—	—	—	—	—	—	—	—	—	—	—
Bursting Charge: Shell, H.E. . . lb.	53·13	29·86	29·86	—	—	11·706	—	5·996	7·528	—	2·711	2·711	2·866	—	2·866	1·102	1·102	—	0·782
Bursting Charge: Shrapnel, . . . lb.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·165
Muzzle Velocity in ft. secs. .	2755·9	2788·77	2788·77	3051·180	2743·20	2788·77	2786	2854	2723	2786	2788	2460	2788	2438·40	2460	2460	2460	2214	1230
Muzzle Energy: Total tons per sq. inch	18·63	17·71	17·71	—	—	17·98	—	18·37	16·86	—	18·37	15·75	18·37	—	18·37	18·37	15·75	—	12·47

305/46 A.V., "Duilio and Cesare" class; 254/45 A., "S. Giorgio" class; 254/45 V., "Pisa"; 203/53 An., 1929, "Zara" class; 203/50 S.An. "Trento" class; 190/45 A.V., "S. Giorgio and Pisa" class; 152/53 An., O.T.O., "Colleoni" class; 152/45 S. "Duilio" class; 120/50 An., "Vivaldi" class; 120/50 A.V., "Quarto" and "Cesare"; 120/45 A., "Leone"; 100/47 O.T.O. "Trento, Zara and Colleoni" class.

JAPANESE NAVAL ORDNANCE

Date and Pattern of Gun.	KM. (1)	V. (2)	A. (3)	V. (4)	A. (5)	A. (6)	V. (7)	— (8)	A. (9)	Carried by
Desig. by Calibre, in cms.	40·6	35·6	20·3	15 2	15 2	15·2	15 2	14	12	(1) Mutsu Class.
Calibre, in inches	16	14	8	6	6	6	6	5·5	4·7	(2) Ise Class. Fuso Class. Kongo Class.
Total length, in feet	..	..	..	..	..	..	..	..	..	
Length of Bore, in ins.	..	..	..	..	..	..	..	..	..	(4) Kongo.
Length of Bore, in cals.	45	45	45	50	50	45	45	50	45	(5) Fuso Class. Kongo Class (except Kongo). Yahagi.
Total weight, in tons.	..	83	17·3	8	8 7	8·5	7·5	6·25	3·3	
Weight of Firing Charge, Armour-piercing Projectile . . lb.	..	..	..	..	..	..	..	..	..	(8) Ise Class. Mutsu Class. Kuma Class. Tenryu Class.
Weight { Armour-piercing Projectile lb.	2190	1100	250	100	100	100	100	82	45	
Weight { Common Shell ,,	..	..	..	..	..	..	..	..	..	(9) Yodo.
Muzzle Velocity, in f.-s., A.P. Projectile	2780	2526	2740	3000	3000	2130	3000	2725	2988	
Muzzle Energy in foot-tons	118,000	62,500	13,100	6300	6300	3165	6300	4250	2810	
Perforation at Muzzle,† wrought iron, inches	65	48·2	30·5	25·5	25·5	18·3	25·5	20·8	19·2	
Perforation Krupp Steel, 3000 yds.	13·8 at 10,970 metres	..	10¼	6½	6½	4½	6½	..	2¼	

† By Tresider's Formula.

BETHLEHEM STEEL CO.

SHIP AND COAST-DEFENCE GUNS.

Calibre.		Length of bore.	Weight of gun, including breech mechanism.		Weight of projectile.		At Muzzle. Velocity.		Energy.		Penetration of steel-plate (De Marre).		Type of Ammunition.
inches.	millimetres.	calibres.	lbs.	kgs.	lbs.	kgs.	ft. per sec.	metres per sec.	foot-tons.	metre-tons.	inches.	milli-metres.	
1·457	37	about {50	160	72·5	1·07	0·48	2,150	655	34	10·5	2·04	51·8	Fixed in cartridge case.
1·850	47	about {50	550	249·5	3·3	1·5	2,400	732	132	41	4·11	104·4	,, ,,
2 244	57	50	960	435·5	6·07	2·75	2,400	732	243	75	5·17	131·3	,, ,,
3	76	50	1950	884·5	13	5·9	2,700	823	658	204	7·71	195·8	,, ,,
			tons.										
4	102	50	2·6	2,642	33	15	2,800	853	1,795	557	11·61	294·9	,, ,,
4	102	50	2·6	2,642	30·86	14	3,000	914	1,928	597	12·22	310·4	,, ,,
5	127	51	5·0	5,080	50	22·7	3,150	960	3,440	1,067	14·56	369·8	Separate, with powder in bag.
6	152	45	7·0	7,112	105	47·6	2,600	792	4,926	1,523	15·47	392·9	Separate, with cartridge case.
6	152	50	8·4	8,534	105	47·6	2,800	853	5,713	1.767	17·19	436·6	Separate, with powder in bag.
6	152	53	10 1	10,260	105	47 6	3,000	914	6,559	2,028	18·97	481·8	,, ,, ,,
7	178	45	12·7	12,900	165	74·8	2,700	823	8,318	2,581	19·11	485·4	,, ,, ,,
7	178	50	14·5	14,730	165	74·8	2,900	884	9,631	2,982	21·16	537·5	,, ,, ,,
8	203	45	18·6	18,900	260	118	2,800	853	14,148	4,379	24·15	613·4	,, ,, ,,
8	203	50	22·3	22,660	260	118	2,900	884	15,177	4,703	25·38	644·6	,, ,, ,,
9·2	234	50	30·4	30,890	380	172	2,900	884	22,181	6,856	28·66	727·9	,, ,, ,,
10	254	45	35·4	35,970	515	234	2,800	853	28,023	8,685	30·97	786·6	,, ,, ,,
10	254	50	43·9	44,600	515	234	2,900	884	30,061	9,327	32·56	827·0	,, ,, ,,
12	305	45	53·8	54,660	870	395	2,800	853	47,341	14,660	37·05	941·1	,, ,, ,,
12	305	50	57·5	58,400	870	395	2,900	884	50,783	15,745	38·95	989·3	,, ,, ,,
14	356	45	64·6	65,650	1,400	635	2,600	792	65,687	20,317	39·69	1008·0	,, ,, ,,
14	356	50	79·4	80,700	1,400	635	2,800	853	76,181	23,567	44·12	1121	,, ,, ,,
15	381	45	86·5	87,880	1,700	771	2,600	792	79,763	24,668	42·35	1076	,, ,, ,,
16	406	45	105·0	106,500	2,100	953	2,600	792	98,530	30,491	45·95	1167	,, ,, ,,
16	406	50	128·0	130,200	2,100	953	2,800	853	114,272	35,369	51·08	1297	,, ,, ,,
16	406	50	140·0	142,400	2,830	1,057	2,700	823	117,900	36,500	52·39	1331	,, ,, ,,
18	457	45	150 0	152,400	3,330	1,510	2,450	747	138.734	42,979	51·71	1313	,, ,, ,,

Guns of 4·7-in. calibre and under, equipped with the wedge-type breech mechanism, are supplied with an automatic breech-opening device, if desired.

UNITED STATES NAVAL ORDNANCE.

GUN.	MARK.	Length in Calibres.	Total Length	Capacity of Chamber in Cubic Inches.	Travel of Projectile in Inches.	Weight of Gun.	Weight of Projectile.	Weight of Charge.	Muzzle Velocity.	Muzzle Energy.	Penetration at Muzzle, Krupp Armour, using Capped-Projectile.
			inch.			tons.	lb.	lb.	ft.-seconds.	ft.-tons.	inch.
3-in. S.A.	V., VI.	50	159	219	128·3	1·0	13	3·85	2700	658	3·3
4-in. R.F.G.	III., IV., V., VI.	40	164	331	134·5	1·5	33	4·85	2000	915	3·4
4-in. R.F.G.	VII.	50	205	652	168·3	2·6	33	9·0	2500	1,430	4·6
4-in. R.F.G.	VIII.‡	50	205	652	168·3	2·9	33	12·3	2800	1,794	5·3
5-in. R.F.G.	II., III., IV.	40	206	656	167·8	3·1	50	10·0	2300	1,845	5·3
5-in. B.L.R.	V., VI.	50	256	1,200	215·6	4·6	60	19·2	2700	3,032	6·2
5-in. B.L.R.	VI.	50	256	1,200	215·6	4·6	50	20·5	3000	3,122	6·4
5-in. R.F.G.	VII.†	51	261	1,135	215·6	5·0	50	23·8	3150	3,439	6·8
6-in. R.F.G.	II., III.	30	196	1,318	145·4	4·8	105	18·8	1950	2,768	5·3
6-in. R.F.G.	IV., VII.	40	256	1,320	205·8	6·0	105	18·8	2150	3,365	6·0
6-in. R.F.G.	IX.	45	270	1,320	221·7	7·0	105	18·8	2250	3,685	6·3
6-in. B.L.R.	VI.	50	300	2,101	247·5	8·3	105	30·0	2600	4,920	8·0
6-in. B.L.R.	VIII.	50	300	2,101	247·5	8·6	105	37·0	2800	5,707	8·3
7-in. B.L.R.	II.	45	323	3,643	259·8	12·7	165	58·0	2700	8,338	9·6
8-in. B.L.R.	III., IV.	35	305	3,170	245·8	13·1	260	43·8	2100	7,948	8·6
8-in. B.L.R.	V.	40	348	5,243	273·1	18 1	260	78·0	2500	11,264	10·6
8-in. B.L.R.	VI.	45	369	5,243	299·1	18·7	260	98·5	2750	13,360	12·0
10-in. B.L.R.	I., II.	30	329	6,779	251·1	25·1	510	90·0	2000	14,141	10·7
10-in. B.L.R.	III.	40	413	10,222	327·0	34·6	510	207·5	2700	25,772	15·6
12-in. B.L.R.	I., II.	35	441	11,991	345·2	45·3	870	160·0	2100	26,596	14·2
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	237·5	2400	34,738	16·8
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	305·0	2600	40,768	18·5
12-in. B.L.R.	V.	45	553	16,974	452·0	52·9	870	305·0	2700	43,964	19·4
12-in. B.L.R.	VI.	45	553	14,970	452·0	53·6	870	340·0	2850	48,984	20·8
12-in. B.L.R.	VII.	50	607	14,296	506·3	56·1	870	340·0	2950	52,483	21·7
13-in. B.L.R.	I., II.	35	479	15,068	374·9	61·4	1130	180·0	2000	31,333	15·0
14-in. B.L.R.	I.	45	642	..	..	63·6	1400	365·0	2600	65,606	39·7*
14-in. B.L.R.	II.	50	700	..	..	82·2	1400	..	2800	76,180	44·1
16-in. B.L.R.	..	45	..	..	..	105·0	2100		2006	98,500	45·95
16-in. B.L.R.	..	50	..	..	..	130·0	2100		2800	114,270	51·08

* De Marre formula.

† All battleships from the Delaware class onward have this gun for torpedo defence.

‡ There is now a 4-in. 50-cal. anti-aircraft gun.

The U.S. Navy has a 5-in. 25-calibre A.A. gun; a 6-in. 53-calibre gun; and an 8-in. 55-calibre gun, but complete details are not yet published.

NOTE ON A NEW ARMOUR-PIERCING SHELL.

(COMMUNICATED.)

NOTWITHSTANDING the claims—economically so attractive—made on their behalf, there is no conclusive evidence that aircraft can as yet be relied upon to replace warships in providing that "sure shield" upon which this country must in the event of war depend; and the maintenance of our Fleet at its highest point of efficiency, always a constant care, becomes the more vital as its comparative strength in relation to that of other Powers is lessened in the process of diplomatic bargaining at Geneva.

The ultimate appeal still remains with the heavily armed and heavily armoured battle fleet, but cruiser actions will be more important in the future than has been the case in the past, by reason of the general reduction in the number of capital ships and the consequently greater necessity for conserving their strength for the *coup de grace*. In any action, however, whether between cruisers or battle fleets, the result will depend upon effective gunfire.

The distribution and thickness of the armour applied to modern warships has already undergone marked alteration in the light of war experience. Higher speeds necessitate reduction in weight, which has been secured in part by improvement in the quality of the armour, and in part by its re-distribution to conform with the revised tactical requirements.

In every instance of daylight actions during the Great War, gunfire was opened at maximum range, restricted only by the existing visibility. Where no such restrictions existed, it was maintained at ranges chosen by the officer commanding the fleet preponderant in artillery and speed, and there is no reason to suppose that these conditions will undergo any change whilst the gun remains as it is to-day—the decisive weapon.

In the 1924 "Annual" the history of the evolution of the modern armour-piercing projectile was reviewed, taking it from the trials carried out by the Special Committee appointed for the purpose of investigating the iron plates best suited for resisting shot in 1862, up to the then latest form of capped armour-piercing projectile for the attack of armour at oblique impact.

The old adage "Thrice armed is he who gets his blow in fust" is as true to-day as ever it was, and those responsible both directly and indirectly for the defence of our country have not been idle in endeavouring to secure for our Fleet the most powerful blow at the earliest possible moment in an action.

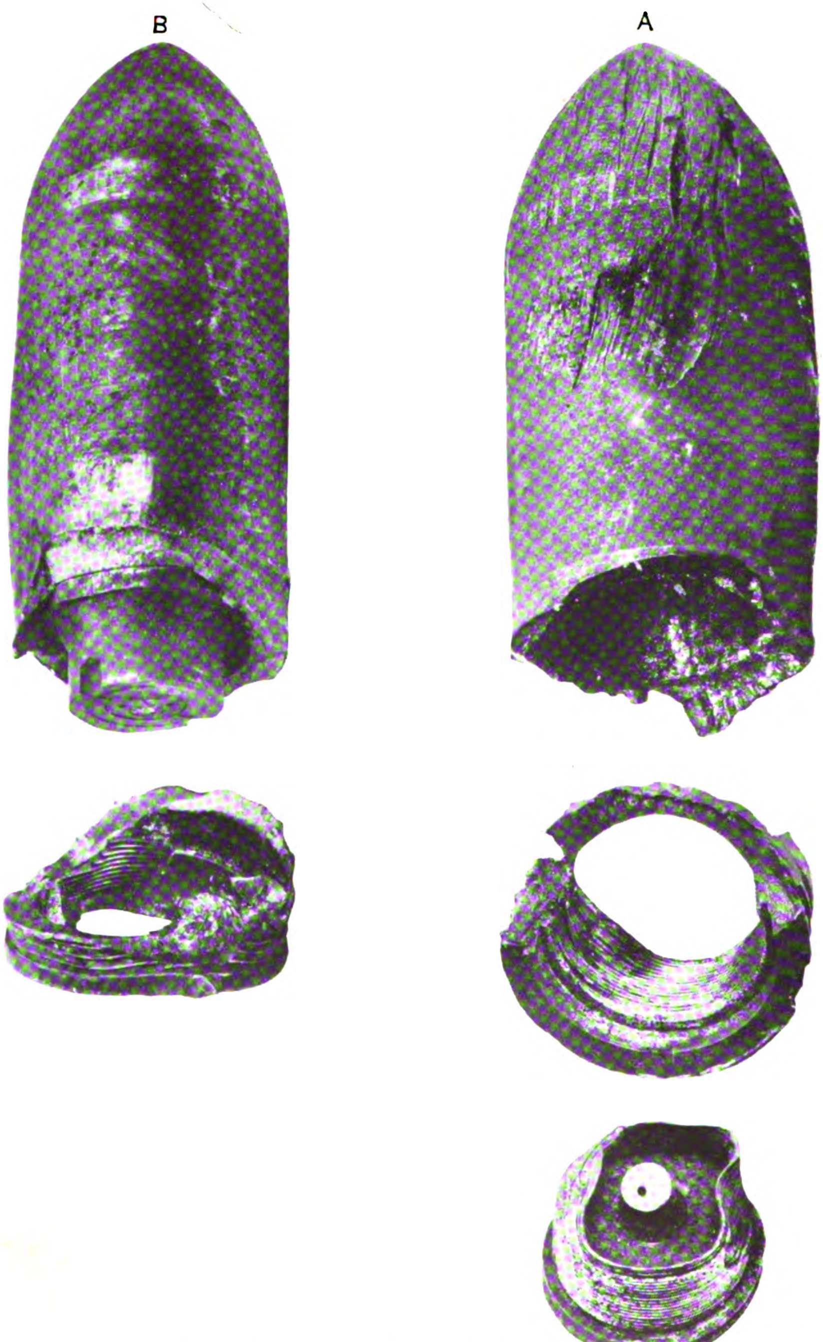
Be the gun never so powerful and accurate, the effective value of the blow delivered depends upon the quality of the projectile and its ability to meet and overcome the protection of the enemy vessel.

A reference to the article which appeared in the 1924 "Annnal" will show that up to that time the process of evolution of the armour-piercing projectile was mainly concerned with its head and the methods adopted for reinforcing the point by various types of cap to overcome the ever-increasing resistance offered by the improvement of armour plates.

A chain of circumstances, however, arising from the need for longer ranges with the higher trajectory and angle of descent has now transferred the need for protection to the base end of the projectile.

To meet modern conditions, armour-piercing shell must be capable of perforating and carrying their charge intact through armour at angles up to 30 degrees to the normal, so that the bursting effect occurs within the enemy ship.

Under oblique attack, a projectile tends to turn to the normal in its passage through the plate, due to the inequality of resistance offered to the two sides of the ogive. This turn to the normal in so short a space of time causes a rapid swing of the shell, and under certain conditions of velocity and plate thickness its base end will strike the edge of the hole with such force as to tear it off, or at least distort it to such an



"RELIEF BASE" FOR ARMOUR-PIERCING SHELL.

Reproduced by permission of Messrs. Hadfields, Ltd., who hold the world patents for this type of shell.

extent as to prevent the action of the fuze. When this occurs the violence of the blow is such that no material can resist it, but it is possible by a special construction of the base end of the shell to avoid any destructive effects on its efficiency from such a blow.

This special construction is the subject of the accompanying illustration. It will be seen that this provides for a hollow space between the rear end of the walls of the shell and the rear end of the adapter, which latter is secured and seated in a position in advance of the point at which the base end blow is found to occur in practice. It thus happens that with a blow which in a shell of ordinary construction would tear off the base end and eject the adapter, the effect upon a shell of this improved pattern will be limited to stripping off the rear portion of the wall, leaving the adapter in place and the fuze undisturbed to perform its proper function of detonation after passing through the plate.

This action is well defined by the accompanying illustration of two shells fired under similar conditions. In the shell marked " A," which is of ordinary construction, the base end has been torn off with adapter and fuse complete; the shell, in consequence, being " blind." In the shell marked " B," with the relieved base, the damage is limited to the skirt of the wall, which has come clean away, leaving the adapter and fuze undisturbed and in a condition for efficient detonation.

With shell of ordinary construction, fracture of the base end of the shell may occur at any velocity, and does so in a percentage of rounds fired against armour at high angles of incidence. With increasing range and diminishing striking velocity, this percentage increases until a point is reached where such failures become inevitable. The relieved base gives immunity against such failures down to a striking velocity some 200 f.s. lower than that at which an ordinary shell can hope to succeed.

Translated into terms of fighting ranges, this would mean that whereas shell of ordinary construction would cease to be efficient at ranges over, say, 12,000 yards, the efficiency of the shell with relieved base is extended to, say, 15,000 yards, so that a ship equipped with this new type of shell can by a choice of fighting range effectively destroy an enemy ship equipped with the ordinary type of shell without herself suffering appreciable damage.

In addition to the risk of base end breakages, and the ejection of the adapter, there is in all cases of angle impacts a serious risk of distortion of the fuze, a factor which in itself may be and frequently is the cause of " blind " shell. The relieved base offers a complete security against such deformation and risk of consequent failure of detonation.

FOREIGN NAVAL AIRCRAFT TYPES.

United States Naval Air Service.

Aircraft, Heavier-than-Air.

Maker, Number, Name,	Type, Number of Seats.	Engine H.P. Make.	Max. speed, m.p.h.	Ceiling, in feet.
Martin. PM–1.	Patrol Flying Boat. Crew of 5.	Two 525 " Cyclone."	120	12,000
Boeing. F4B–4.	Single-seater Fighter.	500 " Wasp."	—	—
Curtiss. F11C–2.	Single-seater Fighter.	575 " Cyclone."	193	25,400
Curtiss. F8C–4. " Helldiver."	Two-seater Fighter. Light Bomber.	450 " Wasp."	141	20,500
Curtiss. N2C–2. " Fledgling."	Two-seater Training.	240 "Whirlwind."	113	17,000
Douglas. PD–1.	Coastal Patrol Flying Boat. Crew of 4.	Two 525 " Cyclone."	121	11,600
Douglas. T2D–1.	Torpedo Bomber and G.P. Seaplane. Three-seater.	Two 525 " Cyclone."	125	—
Loening. OL–9.	Amphibian. Two-seater.	425 " Wasp."	124 Range 650 miles.	
Martin. T4M–1.	Torpedo Bomber and G.P. Three-seater.	525 " Hornet."	116	9,600
Martin. BM–2. Diving Bomber.	High performance Bomber. Two-seater.	525 " Hornet."	140	18,000
Vought. 03U–4. "Corsair."	Two-seater land, sea, or Amphib. Observation.	500 " Wasp."	—	—

All engines are air-cooled. " Wasp " and " Hornet " engines are made by Pratt and Whitney. " Whirlwind " and " Cyclone " engines are made by Wright.

Aircraft, Lighter-than-Air.

The " Los Angeles " (LZ–126) was built by Zeppelin Co., of Friedrichshafen, and flown across the Atlantic (October, 1924) by

United States—*continued.*

a German crew for delivery to the United States. This airship has now been decommissioned. The ZMC–2 was manufactured by the Aircraft Development Corporation, and delivered to the U.S. Navy in September, 1929. She is used at Lakehurst for training.

The "Macon" (ZRS–5), built by the Goodyear Zeppelin Corporation, was delivered to the U.S. Navy in the summer of 1933. She has accommodation for five scouting aircraft, and is provided with trapeze gear enabling the aircraft to return to the airship. The "Akron" (ZRS–4), similar to the "Macon," was lost at sea in April, 1933.

The United States have the following shore naval bases:— Pensacola, Florida (Training); San Diego, California (Fleet Base); Hampton Roads, Viriginia (Fleet Base); Lakehurst, New Jersey (Lighter-than-air craft); Pearl Harbour, Hawaii (Fleet Base); Coco-Solo, Canal Zone (Fleet Base); Anacostia, Columbia (Experimental); Seattle, Washington (Reserve Training Base).

Japanese Naval Air Service.

The following particulars of types of aircraft in use were supplied by a Japanese correspondent to *Aviation* (New York) and published in its issue for July, 1933:—

Type.	Crew.	Engine and H.P.	Weight, lbs.	Speed, m.p.h.
Fighter.				
Navy 3 (Gloster Gambet).	1	Jupiter, 450	3,058	156
Nakajima 90.	1	Jupiter, 450	2,860	193
Reconnaissance.				
Navy 14–II. . . .	3	Lorraine, 450	6,050	111
Navy 15.	2	Hispano, 300	4,290	114
Kawanishi 90	3	Jupiter, 450	5,500	—
Navy 90–II.	2	Jupiter, 450	—	—
Bomber.				
Navy 13	3	Napier, 450	6,270	125
Navy 89	3	Hispano, 600	—	—
Flying Boat.				
Navy 15	4	2 Lorraine, 450	12,815	89
Navy 90–I.	6	3 Hispano, 700	26,400	137
Short 90–II.	6	3 Rolls-Royce, 800	28,600	137

The Hawker "Nimrod" single-seater fighter has been tested and the construction licence purchased from England.

Lighter-than-air craft are based on Kasumigaura. There is one airship built in Japan in 1929 which is reported to be of 7,000 cubic metres capacity and 250 feet long. They also have two "Blimps."

French Naval Air Service.

Lighter-than-air craft activities received a severe set-back when the "Dixmude" (ex-German L27) was lost with all hands off the coast of Sicily on December 20, 1923. The French Navy is now developing two classes of airship, the "Vedettes" and the "Escorteurs." The "Vedettes," of which there are nine, are of about 125,000 cubic feet capacity, speed of about 40 m.p.h., a crew of four, and endurances varying from 15 to 25 hours. The "Escorteurs," of which there are four, are of about 350,000 cubic feet, have a speed of about 40 m.p.h., a crew of six, and an endurance of about 40 hours.

The bases and aerodromes of the Naval Air Service are as follows:

1st Region (Cherbourg).—Chantereyne (Escad. 1B1, Seaplanes); (Escad. 1E1, Flying Boats).

2nd Region (Brest).—Lanion (Escad. 2S1, Flying Boats); Brest (Captive Balloons); Rochefort (Training); Hourtin (Training).

3rd Region (Toulon).—St. Raphael (Experimental); Berre (Escads. 3B1, 3B2, 3B3, Seaplanes, 3E1 and 3E2, Flying Boats); Hyeres (Landplanes), 3C1; 3S1 (Flying Boats).

4th Region (Bizerta).—Karouba (Escads. 4B1, 4B2, 4S1, Seaplanes; 4E1, Flying Boats); Bizerta (Captive Balloons); Bizerte-Sidi-Ahmed (Escad. 4C1, Landplanes).

Maker, Number, Name.	Type, Number of Seats.	Engine H.P. Make.	Max. Speed, m.p.h.	Ceiling, in feet.
C.A.M.S. 37A.	Three-seater Recon. Amphib. or Flying Boat.	450 or 500 Geared "Lorraine" W. Pusher Airscrew.	118	14,760
C.A.M.S. 55	Bomber or Recon. Flying Boat.	Two 480 "Gnome Rhone Jupiter."	130	17,400
Farman "Goliath" F168	Torpedo Bomber Seaplane.	Two 480 "Gnome Rhone Jupiter."	92	13,000
Levasseur P.L.7.	Three-seater Torpedo Bomber.	600 "Hispano"	100	Endurance, 5 hours at cruising speed.
Levasseur P.L.10.	Three-seater Reconnaissance.	600 "Hispano Suiza."	110	Fitted with brake to lock airscrew horizontal for landing.
Nieuport Delage 62C1	Single-seater Fighter.	550 "Hispano Suiza."	156	24,000

Italian Naval Air Service.

Lighter-than-air craft do not exist in Italy, and all experiments and research were abandoned after the disaster to General Nobile in the Italia in 1928, while making an attempt to fly over the North Pole.

Maker, Name. Number,	Type, Number of Seats.	Engine H.P. Make.	Max. Speed, m.p.h.	Ceiling. Endurance in hours.
Piaggio P6ter. Floatplane.	Two-seater Reconnaissance.	410 "Fiat" A20.	121	11,650 4
Macchi. M7ter. Flying Boat.	Single-seater Fighter.	260 "Isotta Fraschini" V6.	124	21,300 3
Macchi. M41bis. Flying Boat.	Single-seater Fighter.	410 "Fiat" A20.	159	20,100 3′ 5″
Fiat. CR20. Floatplane.	Single-seater Fighter. All metal.	410 "Fiat" A20.	159	20,000 3
Savoia. S62bis. Flying Boat.	Three-seater Reconnaissance.	750 "Isotta Fraschini" (Asso.).	140	14,760 5 normal
Savoia. S59bis. Flying Boat.	Two-seater Reconnaissance.	500 "Isotta Fraschini" (Asso.).	130	14,000 4
Savoia. S55. Monoplane. Flying Boat.	Five-seater Twin Hull Reconnaissance or Bomber.	Two 500 "Isotta Fraschini."	118	9,200 4
Macchi. M18. Flying Boat.	Two-seater Reconnaissance.	200–250 "Isotta Fraschini" Semi (Asso.).	107	12,500 4

Italy does not at present use any supercharged engines in her Flying Services. The wearing of parachutes of the "Salvator" type is compulsory for all occupants of Service Aircraft. Nearly all aircraft carry W/T transmitting and receiving sets, and a few are fitted with R/T. Three new types of fleet spotting and reconnaissance aircraft are undergoing trials for eventual adoption for use on ships, but no decision has been reached (November, 1933).

MERCHANT SHIPPING
REFERENCE SECTION.

BRITISH AND IRISH MERCHANT TONNAGE, AND UNITED STATES SEA-GOING MERCHANT TONNAGE, AS COMPARED WITH THE WORLD'S TOTAL MERCHANT FLEET.

Year.	World.	Great Britain and Ireland.	Percentage of British and Irish Tonnage to Total.	United States.*	Percentage of United States Tonnage to Total.
	Tonnage.	Tonnage.		Tonnage.	
1890	21,118,528	10,241,856	48·5	†	—
1891	22,912,753	10,585,747	46·2	†	—
1892	23,672,698	11,157,662	47·1	1,926,426	8·1
1893	24,236,865	11,568,997	47·7	1,964,859	8·1
1894	24,547,597	11,807,010	48·1	2,171,459	8·8
1895	25,086,199	12,117,957	48·3	2,164,753	8·6
1896	25,593,186	12,293,539	48·0	2,234,725	8·7
1897	25,889,044	12,403,409	47·9	2,326,838	9·0
1898	26,543,360	12,587,904	47·4	2,448,677	9·2
1899	27,613,851	12,926,924	46·8	1,872,245	6·8
1900	28,957,358	13,241,446	45·7	2,035,062	7·0
1901	30,479,971	13,656,161	44·8	2,231,925	7·3
1902	32,302,412	14,431,072	44·7	2,342,913	7·3
1903	33,501,855	14,889,571	44·4	2,480,981	7·4
1904	34,786,132	15,391,350	44·2	2,590,349	7·4
1905	35,998,180	15,803,180	43·9	2,649,411	7·4
1906	37,550,477	16,381,350	43·6	2,672,042	7·1
1907	39,435,788	16,909,668	43·1	2,728,711	6·9
1908	40,920,551	17,318,351	42·3	2,802,387	6·8
1909	41,447,825	17,377,936	41 9	2,791,282	6·7
1910	41,912,520	17,516,479	41·8	2,761,605	6·6
1911	43,144,909	17,872,697	41·4	2,808,684	6·5
1912	44,600,677	18,213,620	40·8	2,848,829	6·4
1913	46,970,113	18,696,237	39·8	2,998,457	6·4
1914	49,089,552	19,256,766	39·2	2,970,284	6·0
1915	49,261,769	19,541,368	39·7	3,522,933	7·1
1916	48,683,136	19,134,857	39·3	3,790,578	7·8
1917†	—	—	—	—	—
1918†	—	—	—	—	—
1919	50,919,273	16,555,471	32·5	10,782,170	21·2
1920	57,314,065	18,330,424	32·0	13,789,874	24·0
1921	61,974,653	19,571,554	31·6	14,697,088	23·7
1922	64,370,786	19,295,637	30·0	14,738,506	22·9
1923	65,166,238	19,281,549	29·6	14,597,035	22·4
1924	64,023,567	19,105,838	29·8	13,530,544	21·1
1925	64,641,418	19,440,711	30·1	12,948,632	20·0
1926	64,784,370	19,399,797	29·9	12,364,668	19·1
1927	65,192,910	19,309,022	29·6	12,070,050	18·5
1928	66,954,659	19,875,350	29·6	11,997,441	17·9
1929	68,074,312	20,166,331	29·6	11,835,176	17·4
1930	69,607,644	20,438,444	29·4	11,388,367	16·4
1931	70,131,040	20,302,905	28·9	10,998,606	15 7
1932	69,734,310	19,671,675	28·2	10,889,419	15·6
1933	67,920,185	18,700,739	27·5	10,692,798	15·7

* Excluding American Great Lakes vessels.

† Figures not available.

NOTE.—Prior to 1919 the tonnages shown are the totals of gross tonnage for steam and motor vessels, and *net* tonnage for sailing vessels; in 1919 and subsequent years the figures are given in gross tonnage throughout.

NUMBER AND GROSS TONNAGE OF THE VESSELS OF 100 TONS
TO EACH OF THE SEVERAL COUNTRIES OF THE

Flag.	June, 1913.†		June, 1919.		June, 1922.	
	No.	Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland	9,214	18,696,237	7,964	16,555,471	8,849	19,295,637
British Dominions .	2,073	1,735,306	2,141	2,052,404	2,472	2,746,883
British Empire . .	11,287	20,431,543	10,105	18,607,875	11,321	22,042,520
United States of America — Sea . .	2,696	2,998,457	4,350	10,782,170	4,886	14,738,506
United States of America — Lakes . .	627	2,382,690	506	2,257,786	495	2,247,690
United States of America — Philippine Islands .	77	46,489	73	51,817	99	76,264
United States of America — Total .	3,400	5,427,636	4,929	13,091,773	5,480	17,062,460
Argentine	308	214,835	215	154,441	216	181,555
Austria-Hungary . .	427	1,011,414	339	714,617	—	—
Belgium	172	304,386	152	313,276	275	579,477
Brazil	459	329,637	428	512,675	399	492,571
Chile.	131	139,792	114	101,647	126	131,401
China	66	86,690	102	132,515	134	188,388
Cuba	59	61,536	51	47,295	65	62,677
Denmark	811	762,054	645	702,436	822	1,038,138
Esthonia	—	—	—	—	98	45,259
Finland	—	—	338	180,962	352	213,671
France	1,552	2,201,164	1,440	2,233,631	2,094	3,845,792
Germany	2,321	5,082,061	1,768	3,503,380	1,723	1,887,408
Greece	442	722,782	312	323,796	379	668,127
Holland	759	1,309,849	931	1,591,911	1,164	2,632,713
Italy	1,114	1,521,942	858	1,870,097	1,413	2,866,335
Japan *	1,037	1,500,014	1,418	2,325,266	2,026	3,586,918
Jugo-Slavia	—	—	‡	‡	‡	‡
Latvia	—	—	—	—	67	40,124
Norway	2,191	2,457,890	1,629	1,857,829	1,852	2,600,861
Peru	60	45,514	63	79,342	74	101,209
Portugal	208	120,579	227	261,212	286	285,878
Roumania	33	45,408	35	63,792	31	72,297
Russia	1,216	974,178	618	541,005	—	—
Spain	607	840,995	576	750,611	973	1,282,757
Sweden	1,436	1,047,270	1,263	992,611	1,345	1,115,375
Turkey	272	157,298	161	116,249	—	—
Other Countries and flag not recorded .	158	98,115	495	304,530	1,167	1,270,564
Total	30,591	46,970,113	29,255	50,919,273	33,935	64,370,786

* Japanese sailing vessels are not recorded in Lloyd's Register Book.

† In 1913 the figure shown is the total of the gross tonnage of steam and motor vessels, and the *net* tonnage of sailing vessels; in 1919 and subsequent years the figure is given in gross tons throughout.

‡ Figures included in total for "Other countries."

GROSS AND UPWARDS (STEAM, SAIL, AND MOTOR) BELONGING
WORLD, AS RECORDED IN LLOYD'S REGISTER.

June, 1926.		June, 1929.		June, 1932.		June, 1933.	
No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
8,369	19,399,797	8,172	20,166,331	7,971	19,671,675	7,705	18,700,739
2,477	2,870,327	2,507	2,949,816	2,547	3,112,708	2,528	3,118,948
10,864	22,270,124	10,679	23,116,147	10,518	22,784,383	10,233	21,819,687
4,001	12,364,668	3,696	11,835,176	3,252	10,889,419	3,176	10,692,798
529	2,433,049	576	2,541,938	574	2,552,532	554	2,567,027
97	81,044	111	104,908	120	104,669	115	97,974
4,627	14,878,761	4,383	14,482,022	3,946	13,546,620	3,845	13,357,799
242	234,848	311	296,236	345	336,771	346	342,477
—	—	—	—	—	—	—	—
225	507,473	244	529,043	240	537,442	212	456,207
361	482,308	391	560,680	309	496,130	310	493,755
138	179,712	119	154,563	111	178,680	102	155,710
201	299,806	218	319,224	250	371,153	263	401,345
72	61,735	66	45,270	61	44,016	57	39,282
771	1,081,146	701	1,055,867	730	1,180,620	726	1,168,071
115	49,025	116	60,383	146	106,017	157	125,662
363	232,792	348	298,323	324	332,385	366	420,792
1,769	3,490,606	1,662	3,378,663	1,644	3,557,006	1,627	3,512,219
1,986	3,110,918	2,127	4,092,552	2,151	4,164,842	2,084	3,901,274
467	924,944	516	1,266,685	551	1,470,064	537	1,417,071
1,109	2,564,904	1,339	2,939,067	1,445	2,963,840	1,412	2,765,457
1,401	3,240,630	1,380	3,284,660	1,323	3,390,572	1,278	3,149,807
2,087	3,967,617	2,059	4,186,652	1,964	4,255,014	2,019	4,258,159
137	195,787	153	281,396	185	381,045	180	374,467
87	67,783	108	150,159	114	188,479	116	197,974
1,844	2,841,905	1,807	3,224,493	2,008	4,166,839	1,970	4,079,540
46	79,068	38	62,160	39	64,686	38	59,943
285	280,116	269	246,368	259	269,013	263	266,481
37	68,173	34	68,647	33	74,104	36	93,348
370	323,284	379	440,506	449	685,144	443	843,212
924	1,163,008	877	1,161,591	861	1,265,321	865	1,232,456
1,380	1,338,089	1,385	1,510,125	1,483	1,715,984	1,395	1,674,974
174	136,796	189	172,096	189	178,053	187	188,461
468	637,799	584	690,734	619	1,030,087	632	1,124,555
32,615	64,784,370	32,482	68,074,312	32,247	69,734,310	31,700	67,920,185

* Japanese sailing vessels are not recorded in Lloyd's Register Book.
‡ Figures included in total for "Other Countries."

NUMBERS OF STEAMERS AND MOTORSHIPS OWNED BY THE PRINCIPAL MARITIME COUNTRIES ON JUNE 30, 1933, BY DIVISIONS OF AGE.

Country.	Numbers of Vessels owned of Various Ages.						Total Number of Vessels owned.	Percentage of Total Number of Ships under 5 years old.
	Under 5 years.	5 years and under 10 years.	10 years and under 15 years.	15 years and under 20 years.	20 years and under 25 years.	25 years and over.		
Gt. Brit. & Ireland	831	1,255	1,314	1,284	889	1,755	7,328	11·3
British Dominions	250	373	347	251	325	639	2,185	11·4
United States * .	124	118	1,207	481	208	512	2,650	4·7
Denmark . . .	87	93	187	93	52	193	705	12·3
France	158	97	397	224	203	432	1,511	10·5
Germany . . .	171	314	561	241	238	546	2,071	8·2
Holland . . .	246	241	260	263	129	253	1,392	17·7
Italy	75	120	190	133	140	394	1,052	7·1
Japan	235	196	483	480	147	478	2,019	11·6
Norway . . .	293	239	351	317	209	556	1,965	14·9
Spain	99	36	181	106	42	336	800	12·4
Sweden . . .	74	73	190	164	103	735	1,339	5·5
Other Countries .	369	270	444	422	520	1,949	3,974	9·3
World Total* .	3,012	3,425	6,112	4,459	3,205	8,778	28,991	10·4

* Excluding American Great Lakes vessels.

NUMBERS OF STEAMERS AND MOTORSHIPS OWNED BY THE PRINCIPAL MARITIME COUNTRIES ON JUNE 30, 1933, BY DIVISIONS OF GROSS TONNAGE.

Country.	Numbers of Vessels Owned of Various Gross Tonnages.										Total Number of Vessels owned.	Percentage of Total Number of Vessels of 6000 gross tons and over.
	100 tons and under 500 tons.	500 tons and under 1000 tons.	1000 tons and under 2000 tons.	2000 tons and under 4000 tons.	4000 tons and under 6000 tons.	6000 tons and under 8000 tons.	8000 tons and under 10,000 tons	10,000 tons and under 15,000 tons.	15,000 tons and under 20,000 tons.	20,000 tons and over.		
Gt. Brit. & Ireland	3,294	655	656	631	1,159	535	184	130	51	33	7,328	12·7
British Dominions	1,064	292	389	257	106	42	18	13	2	2	2,185	3·5
United States * .	617	141	190	445	642	435	112	49	12	7	2,650	23·2
Denmark . . .	232	84	220	92	43	15	14	5	—	—	705	4·8
France	697	109	150	232	173	59	52	27	6	6	1,511	9·9
Germany . . .	1,028	275	238	191	138	117	50	19	6	9	2,071	9·7
Holland . . .	750	71	139	175	90	97	48	13	7	2	1,392	12·0
Italy	350	93	108	158	218	83	19	9	3	11	1,052	11·9
Japan	821	198	229	355	259	102	36	16	3	—	2,019	7·8
Norway . . .	735	192	417	213	215	137	43	11	2	—	1,965	9·8
Spain	391	77	83	178	43	18	3	7	—	—	800	3·5
Sweden . . .	602	171	364	107	65	13	11	2	3	1	1,339	2·2
Other Countries .	1,473	575	633	765	409	71	28	19	—	1	3,974	3·0
World Total * . .	12,054	2,933	3,816	3,799	3,560	1,724	618	320	95	72	28,991	9·8

* Excluding American Great Lakes vessels.

NUMBER AND TONNAGE OF MOTORSHIPS (EXCLUDING VESSELS FITTED WITH AUXILIARY MOTORS) OWNED BY VARIOUS NATIONS.

	June, 1923.		June, 1927.		June, 1930.		June, 1932.		June, 1933.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Gt. Brit. & Ireland	139	374,873	291	1,167,301	453	2,246,166	511	2,609,554	520	2,601,336
British Dominions	44	14,084	100	94,959	167	174,939	221	195,038	241	212,762
United States * .	97	139,786	188	349,786	258	600,453	288	681,590	288	679,465
Denmark . . .	40	132,542	68	219,246	89	341,509	117	426,607	122	441,915
France . . .	34	27,958	26	34,377	46	139,186	72	194,952	97	224,803
Germany . . .	45	84,528	112	315,141	183	537,261	211	591,158	217	618,248
Holland . . .	52	66,577	85	192,807	272	534,873	400	715,827	418	702,673
Italy	34	61,374	64	363,822	112	494,709	131	575,314	136	584,888
Japan	20	4,375	73	99,290	157	385,097	220	548,976	279	581,915
Norway . . .	130	177,071	197	580,551	292	1,279,847	366	1,738,572	367	1,744,690
Spain	8	13,378	25	45,927	47	117,940	66	209,307	78	212,748
Sweden . . .	103	173,697	119	295,646	143	459,099	151	526,719	151	532,556
Other countries .	73	45,688	120	207,718	244	472,960	336	716,903	360	751,359
World's total *.	819	1,315,931	1,468	3,966,571	2,463	7,783,539	3,090	9,730,517	3,264	9,889,358

* Excluding American Great Lakes vessels.

STEAMSHIP AND MOTORSHIP TONNAGE (INCLUDING AUXILIARIES) OWNED BY VARIOUS COUNTRIES, AS AT JUNE, 1933

Country.	Steamships.			Motorships.		
	No.	Gross tonnage.	Percentage of total steamship and motorship tonnage.	No.	Gross tonnage.	Percentage of total steamship and motorship tonnage.
Gt. Britain and Ireland	6,734	15,977,087	85·9	594	2,615,117	14·1
British Dominions .	1,847	2,745,654	92·1	338	237,101	7·9
British Empire . .	8,581	18,722,741	86·8	932	2,852,218	13·2
United States * . .	2,342	9,399,354	93·2	308	689,084	6·8
Denmark	489	698,984	60·3	216	461,249	39·7
France	1,377	3,236,555	93·3	134	232,983	6·7
Germany	1,555	3,217,885	82·8	516	670,102	17·2
Holland	878	2,041,065	74·0	514	717,747	26·0
Italy	839	2,485,449	80·4	213	607,323	19·6
Japan	1,570	3,649,213	85·7	449	608,946	14·3
Norway	1,546	2,323,957	57·0	419	1,754,176	43·0
Spain	675	996,523	81·9	125	221,445	18·1
Sweden	1,024	1,099,780	66·3	315	558,368	33·7
Other countries . .	3,459	6,106,285	88·4	515	801,926	11·6
World's Total* .	24,335	53,977,791	84·1	4,656	10,175,567	15·9

* Excluding American Great Lakes vessels.

NUMBER AND GROSS TONNAGE OF MOTORSHIPS OF OVER 8,000 TONS GROSS, OWNED BY VARIOUS NATIONS, AS AT JUNE, 1933.

Country.	8,000 and under 10,000 tons gross.		10,000 and under 15,000 tons gross.		15,000 tons gross and above.		Total over 8,000 tons gross.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Great Britain and Ireland . . .	61	535,116	20	233,260	13	261,352	94	1,029,728
British Dominions.	5	44,757	5	57,373	—	—	10	102,130
United States . .	22	195,114	6	66,008	—	—	28	261,122
Denmark . . .	10	86,209	3	30,851	—	—	13	117,060
France	3	27,927	5	58,483	3	59,489	11	145,899
Germany . . .	7	63,647	8	101,169	2	33,431	17	198,247
Holland. . . .	26	223,339	5	53,943	5	87,833	36	365,115
Italy	7	62,154	4	48,880	5	117,803	16	228,837
Japan	13	115,942	5	58,719	3	51,448	21	226,109
Norway . . .	39	350,411	2	24,413	—	—	41	374,824
Russia	2	16,456	—	—	—	—	2	16,456
Spain	—	—	3	36,011	—	—	3	36,011
Sweden . . .	11	98,576	1	10,409	4	68,479	16	177,464
Other countries .	14	123,652	12	146,417	—	—	26	270,069
World's Total .	220	1,943,300	79	925,936	35	679,835	334	3,549,071

NUMBER AND TONNAGE OF TANKERS OWNED BY VARIOUS NATIONS.*

	June, 1923.		June, 1925.		June, 1927.		June, 1929.		June, 1932.		June, 1933.	
	No.	Tons gross.	No.	Tons gross.	No.	Tons gross.	No.	Tons gross.	No.	Tons gross.	No.	Tons gross.
Great Britain and Ireland	312	1,691,257	315	1,708,978	352	1,934,186	388	2,165,208	393	2,316,425	380	2,269,088
British Dominions	39	196,639	34	185,836	34	181,041	39	227,969	49	267,129	57	332,982
British Empire	351	1,887,896	349	1,894,814	386	2,115,227	427	2,393,177	442	2,583,554	437	2,602,070
United States	399	2,497,625	374	2,281,324	374	2,293,539	381	2,374,358	393	2,518,544	389	2,501,738
Belgium	7	36,471	7	34,982	6	39,533	8	46,305	9	60,348	9	60,348
Denmark	2	11,561	2	9,647	3	12,660	9	59,475	12	84,450	13	92,483
France	19	105,233	28	151,089	27	146,872	29	169,298	38	221,300	40	235,318
Germany	9	36,675	12	55,754	20	94,258	26	125,387	29	136,977	30	148,265
Holland	35	115,804	46	148,109	58	199,110	74	261,255	79	334,604	75	320,900
Italy	18	89,399	28	128,904	45	205,871	57	255,020	77	367,021	69	334,486
Japan	10	64,036	8	47,137	9	47,531	13	76,911	20	122,337	21	125,043
Norway	33	178,368	42	243,455	63	403,812	117	781,575	217	1,539,348	214	1,508,033
Spain	8	30,604	8	30,648	8	30,602	8	30,602	15	77,880	17	80,292
Sweden	2	6,599	2	4,873	3	16,270	7	49,127	17	141,369	17	139,836
Other countries	24	100,652	33	146,894	48	241,801	80	365,432	110	621,089	111	608,020
World's Total	917	5,160,923	939	5,177,630	1,050	5,847,086	1,236	6,987,922	1,458	8,808,821	1,442	8,756,832

* Excluding Tankers of less than 1,000 tons gross.

NUMBER AND TONNAGE OF MERCHANT VESSELS LAUNCHED.*

	1913.		1919.		1923.		1925.		1929.		1933 (1st 9 months).	
	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland	688	1,932,153	612	1,620,442	222	645,651	342	1,084,633	489	1,522,623	72	66,055
British Dominions	77	26,744	235	298,495	41	37,072	47	32,220	47	21,327	13	10,236
United States †	182	228,232	852	3,579,826	69	96,491	94	78,766	59	100,632	4	3,185
Denmark	31	40,932	46	37,766	24	49,479	21	73,268	34	111,496	17	31,312
France	89	176,095	34	32,633	27	96,644	35	75,569	16	81,607	23	26,270
Germany	162	465,226	No returns.		109	345,062	121	406,374	85	249,077	39	32,509
Holland	95	104,296	100	137,086	35	65,632	47	78,823	77	186,517	12	20,690
Italy	38	50,356	32	82,713	21	66,523	31	142,046	32	71,497	2	3,971
Japan	152	64,664	133	611,883	44	72,475	23	55,784	40	164,457	22	45,489
Norway	74	50,637	82	57,578	48	42,619	48	28,805	51	39,604	6	7,104
Spain	12	8,488	41	52,609	7	4,488	1	127	8	37,023	2	7,356
Sweden	25	18,524	53	50,971	10	20,118	17	53,750	29	107,246	10	44,560
Other Countries	88	96,724	36	26,755	27	20,410	17	19,371	38	62,859	6	5,630
World's Total	1713	3,282,071	2256	6,588,757	684	1,562,664	844	2,129,536	1005	2,755,965	228	304,367

* Figures given include all steamers, motorships, and sailing vessels of 100 gross tons and upwards.

† Excluding vessels built at ports on the Great Lakes of America.

MERCHANT VESSELS UNDER CONSTRUCTION.*

	1913.		1919.		1925.		1929.		1933.	
	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage	No.	Gross Tonnage.
Gt. Britain and Ireland .	508	1,987,254	781	2,816,773	257	1,009,155	341	1,448,355	87	303,762
British Dominions	67	36,923	151	254,632	23	32,047	32	33,973	3	5,830
United States †	60	121,304	641	3,161,714	36	69,866	26	96,010	9	14,654
Denmark	11	25,257	45	68,074	18	70,760	19	80,855	9	31,970
France	42	249,595	64	174,736	36	150,220	19	135,776	27	95,838
Germany	92	535,555	No returns.		73	306,626	66	235,499	7	30,300
Holland	50	128,730	113	288,042	44	127,775	55	224,029	12	40,862
Italy	19	56,126	108	285,928	40	269,802	36	69,834	4	27,076
Japan	17	64,905	64	299,600	13	53,270	23	156,810	15	85,570
Norway	45	41,746	73	83,941	22	19,770	25	32,370	6	11,310
Spain	4	2,830	26	90,705	5	11,427	13	45,137	13	31,924
Sweden	13	16,665	64	101,217	20	71,580	31	111,427	14	71,440
Other Countries	22	89,036	49	60,353	22	14,607	16	19,191	10	6,216
World's Total . .	968	3,368,054	2179	7,685,715	609	2,206,905	739	2,801,839	216	756,752

* The figures give the number and aggregate gross tonnage of steamers, motorships, and sailing vessels under construction on September 30 of each year.

† Excluding vessels building at ports on the Great Lakes of America.

ANNUAL MERCHANT SHIPPING LOSSES OF THE WORLD.*

	1913.			1919.			1924.			1929.			1931.			1932		
	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.
Gt. Brit. & Ireland	113	199,453	1·07	99	151,653	·92	74	111,207	·58	61	113,420	·56	43	35,080	·17	51	59,326	·30
British Dominions	37	20,091	1·16	89	52,539	2·56	61	41,325	1·49	50	41,253	1·40	28	28,819	·94	32	33,566	1·08
United States ‡ .	91	71,469	2·38	115	150,272	1·15	64	87,418	·65	44	78,103	·66	20	27,714	·25	30	43,308	·40
Denmark . . .	13	6,583	·86	15	5,295	·75	13	14,198	1·37	10	11,066	1·05	4	4,196	·37	5	3,753	·32
France	30	34,506	1·57	34	40,420	1·81	25	27,726	·79	32	33,291	·99	18	17,094	·48	18	23,384	·66
Germany . . .	31	56,379	1·11	50	24,167	—	26	23,095	·78	29	34,243	·84	13	10,207	·24	9	6,489	·15
Holland . . .	4	1,340	·10	23	11,550	·73	1	801	·03	4	2,689	·09	8	9,379	·30	4	15,139	·51
Italy	26	26,881	1·77	8	3,096	·23	16	38,810	1·37	26	38,226	1·16	17	25,068	·75	10	17,246	·51
Japan†	25	25,514	1·7	38	41,418	1·77	42	70,933	1·85	33	67,032	1·60	37	54,011	1·26	24	55,777	1·31
Norway . . .	61	60,648	2·47	41	44,132	2·37	22	23,786	·95	30	25,460	·79	14	17,681	·43	10	10,680	·26
Spain	13	15,928	1·89	16	9,752	1·30	10	10,181	·82	9	16,805	1·45	7	9,334	·76	6	15,760	1·25
Sweden	30	17,327	1·65	38	29,021	2·92	16	16,627	1·33	11	8,236	·55	12	9,252	·54	6	6,194	·36
Other Countries .	36	42,686	—	65	54,719	—	52	65,438	—	64	86,302	—	58	88,273	—	44	82,542	—
World's Total .	542	608,235	—	635	622,805	—	422	531,545	—	403	556,126	—	279	336,108	—	249	373,164	—

* Figures refer to steam, motor, and sailing vessels of 100 gross tons and over totally lost, condemned, etc. The tonnage given is gross for steamers and motorships, and net for sailing ships up to and including the returns for 1919; in subsequent returns the tonnage is gross for steamers, motorships, and sailing ships.

† Japanese sailing vessels not included.

‡ Excluding ships trading on the Great Lakes of America.

Largest Merchant Vessels of the World.

A list of all vessels of 10,000 tons gross or more arranged in order of gross tonnage.

(T.= turbine engines; M.= oil engines; T. & R.= turbines & reciprocating engines; T.E.= turbo-electric.)

Gross tonnage.	Name.	Speed † (knots.)	Date built.	Flag.	Owners.	L.* (ft.)	B*. (ft.)	D.* (ft.)
68,000	Normandie (T.E.)	—	1933	Fr.	C.G.T. (French Line)	962·0	117·7	91·8
56,621	Majestic (T.)	25	1921	Br.	White Star Line	915·5	100·1	58·2
52,101	Berengaria (T.)	23	1912	Br.	Cunard Line	883·6	98·3	57·1
51,656	Bremen (T.)	26	1929	Ger.	Norddeutscher Lloyd	898·7	101·9	48·2
51,062	Rex (T.)	—	1932	Ital.	Italia Line	833·8	97·1	47·3
49,746	Europa (T.)	26	1928	Ger.	Norddeutscher Lloyd	890·2	102·1	48·0
48,943	Leviathan (T.)	24	1914	U.S.	United States Lines	907·6	100·3	58·2
48,502	Conte di Savoia (T.)	—	1932	Ital.	Italia Line	814·6	96·1	32·4
46,439	Olympic (T. & R.)	22½	1911	Br.	White Star Line	852·5	92·5	59·5
45,647	Aquitania (T.)	23	1914	Br.	Cunard Line	868·7	97·0	49·7
43,153	Ile de France (T.)	23	1926	Fr.	C.G.T. (French Line)	763·7	92·0	55·9
42,512	L'Atlantique (T.)‡	24	1930	Fr.	Cie. de Nav. Sud-Atlantique	713·6	91·8	57·7
42,348	Empress of Britain (T)	24	1931	Br.	Canadian Pacific	733·3	97·8	56·0
34,569	Paris (T.)	21½	1921	Fr.	C.G.T. (French Line)	735·4	85·3	59·1
34,351	Homeric	20	1922	Br.	White Star Line	751·0	83·3	48·6
32,583	Roma (T.)	21	1926	Ital.	Italia Line	664·7	82·6	51·5
32,565	Columbus (T.)	21	1922	Ger.	Norddeutscher Lloyd	749·6	83·1	49·4
30,696	Mauretania (T.)	25	1907	Br.	Cunard Line	762·2	88·0	57·1
30,418	Augustus (M.)	19	1927	Ital.	Italia Line	710·9	82·8	46·5
28,912	Champlain (T.)	—	1931	Fr.	C.G.T. (French Line)	607·0	82·8	67·8
28,291	Statendam (T.)	19	1926	Holl.	Holland-Amerika Line	674·2	81·3	49·4
27,759	Georgic (M.)	18	1932	Br.	White Star Line	683·6	82·4	48·6
27,561	Cap Arcona (T.)	20	1927	Ger.	Hamburg Sud-Amerika Line	643·6	84·6	41·9
27,132	Belgenland (T. & R.)	17½	1917	Br.	F. Leyland & Co.	674·2	78·4	44·7
26,943	Britannic (M.)	18	1930	Br.	White Star Line	683·6	82·4	48·6
26,032	Empress of Japan (T.)	—	1930	Br.	Canadian Pacific	644·0	83·8	44·5
25,661	Conte Grande (T.)	21	1928	Ital.	Italia Line	652·2	78·3	27·2
25,178	Lafayette (M.)	17	1929	Fr.	C.G.T. (French Line)	577·2	77·6	27·9
24,679	Adriatic	18	1906	Br.	White Star Line	709·2	75·5	52·0
24,416	Conte Biancamano (T.)	20	1925	Ital.	Italia Line	650·9	76·1	27·5
24,289	Manhattan (T.)	20	1932	U.S.	United States Lines	668·4	86·3	33·3
24,289	Washington (T.)	—	1933	U.S.	United States Lines	668·4	86·3	33·3
24,281	Duilio (T.)	21	1923	Ital.	Italia Line	602·4	76·3	46·3
24,149	Rotterdam	17	1908	Holl.	Holland-Amerika Line	650·5	77·4	43·5
23,970	Vulcania (M.)	19	1927	Ital.	Cosulich Line	631·4	79·8	24·4
23,940	Saturnia (M.)	19	1927	Ital.	Cosulich Line	631·4	79·8	29·5
23,788	George Washington	18	1908	U.S.	U.S. Shipping Board	699·1	78·2	50·1
23,769	France (T.)	22½	1912	Fr.	C.G.T. (French Line)	690·1	75·6	48·5
22,575	Queen of Bermuda (T.E)	20	1933	Br.	Furness Withy	553·4	76·7	39·0
22,547	Strathnaver (T.E.)	20½	1931	Br.	P. & O.	638·7	80·2	33·1
22,544	Strathaird (T.E.)	20½	1932	Br.	P. & O.	638·0	80·0	33·0
22,424	Monarch of Bermuda (T.E.)	20	1931	Br.	Furness Withy	553·2	76·7	39·0
22,181	Alcantara (T.)	16½	1926	Br.	Royal Mail	630·5	78·5	40·5
22,071	Asturias (T.)	16½	1925	Br.	Royal Mail	630·5	78·5	40·5
21,998	Minnetonka (T.)	16½	1924	Br.	Atlantic Transport Line	600·8	80·4	49·4
21,936	President Hoover (T.E.)	21	1930	U.S.	Dollar S.S. Lines	615·0	81·0	52·0
21,936	President Coolidge (T.E.)	21	1931	U.S.	Dollar S.S. Lines	615·0	81·0	52·0
21,867	New York (T.)	19½	1927	Ger.	Hamburg-Amerika Line	602·5	79·0	42·1
21,833	Empress of Australia (T.)	18	1914	Br.	Canadian Pacific	589·9	75·2	41·5
21,782	Giulio Cesare (T.)	19	1921	Ital.	Italia Line	602·4	76·5	46·3
21,716	Minnewaska (T.)	16½	1923	Br.	Atlantic Transport Line	600·8	80·4	49·4
21,691	Hamburg (T.)	19½	1925	Ger.	Hamburg-Amerika Line	602·5	78·7	51·6
21,517	Empress of Canada (T.)	20	1922	Br.	Canadian Pacific	627·0	77·9	42·2
21,329	America	17	1905	U.S.	U.S. Shipping Board	668·8	74·3	47·8
21,011	Cap Polonio (T. & R.)	18	1914	Ger.	Hamburg Sud-Amerika Line	637·8	72·4	39·5
20,952	Mooltan (R. & T.E.)	17½	1923	Br.	P. & O.	600·8	73·4	48·6
20,931	Albert Ballin (T.)	19½	1923	Ger.	Hamburg-Amerika Line	602·4	78·7	41·9
20,914	Maloja (T. & R.)	17½	1923	Br.	P. & O.	600·8	73·4	48·6
20,742	Deutschland (T.)	19½	1923	Ger.	Hamburg-Amerika Line	602·4	72·2	41·9
20,445	Warwick Castle (M.)	18	1930	Br.	Union Castle Line	651·5	75·5	37·4
20,277	Carinthia (T.)	16½	1925	Br.	Cunard Line	600·7	73·8	40·7
20,223	Kungsholm (M.)	17	1928	Swed.	Svenska-Amerika Line	594·9	78·2	37·8
20,175	Franconia (T.)	16½	1923	Br.	Cunard Line	601·3	73·7	40·6
20,123	Duchess of Bedford (T.)	17½	1928	Br.	Canadian Pacific	581·9	75·2	41·8
20,119	Duchess of Atholl (T.)	17½	1928	Br.	Canadian Pacific	580·0	75·3	41·8
20,109	Winchester Castle (M.)	18	1930	Br.	Union Castle Line	631·6	75·5	37·5
20,063	Carnarvon Castle (M.)	18	1926	Br.	Union Castle Line	630·7	73·5	41·5

* The registered dimensions are measured as follows: Length from fore part of stem at extreme top to aft side of head of stern post, or centre of rudder stock if a balanced rudder is fitted; Breadth is taken to outside of plating; Depth from top of beam at centre line of tonnage deck amidships to ceiling. If there is no ceiling it is measured to the tank top. If there are more than two decks, the tonnage deck is the second deck, counting from below.

† The speeds shown in this Table are as given by the owners.

‡ Gutted by fire on January 5, 1933.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
20,032	Otranto (T.)	18	1925	Br.	Orient Line	632·0	75·2	32·9
20,022	Duchess of Richmond (T.)	18	1928	Br.	Canadian Pacific	581·9	75·2	41·7
20,021	Duchess of York (T.)	18	1929	Br.	Canadian Pacific	581·9	75·2	41·7
20,001	Oronsay (T.)	18	1925	Br.	Orient Line	633·6	75·2	33·0
19,970	Orontes (T.)	18	1929	Br.	Orient Line	632·0	75·2	33·0
19,941	Orford (T.)	18	1927	Br.	Orient Line	632·2	75·4	33·1
19,821	Reliance (T. & R.)	17	1920	Ger.	Hamburg-Amerika Line	590·4	72·3	39·7
19,777	Orama (T.)	18	1924	Br.	Orient Line	632·0	75·2	32·9
19,761	Scythia (T.)	16½	1920	Br.	Cunard Line	600·7	73·8	40·7
19,703	Resolute (T. & R.)	17	1920	Ger.	Hamburg-Amerika Line	590·4	72·2	40·2
19,695	Laconia (T.)	16½	1922	Br.	Cunard Line	601·3	73·7	40·6
19,648	Viceroy of India (T.E.)	18	1928	Br.	P. & O.	582·7	76·0	45·5
19,597	Samaria (T.)	16½	1921	Br.	Cunard Line	601·5	73·7	40·7
19,507	Oceania (M.)	—	1933	Ital.	Cosulich Line	589·7	76·7	45·5
19,475	Neptunia (M.)	19	1932	Ital.	Cosulich Line	589·7	76·5	45·5
19,361	Monticello	23½	1902	U.S.	U.S. Shipping Board	684·3	72·3	40·2
19,129	Marnix v. St. Aldegonde (M.)	17	1929	Holl.	Nederland Stoom. Maats.	580·0	74·0	47·3
19,040	Johan v. Oldenbarnevelt (M.)	17	1929	Holl.	Nederland Stoom. Maats.	580·0	74·6	47·3
19,029	Arundel Castle (T.)	18	1921	Br.	Union Castle Line	630·5	72·5	41·5
18,973	Windsor Castle (T.)	18	1922	Br.	Union Castle Line	632·4	72·5	41·6
18,940	Albertic	16½	1923	Br.	White Star Line	590·8	72·0	37·6
18,765	Conte Verde (T.)	19	1923	Ital.	Italia Line	570·2	74·2	35·9
18,724	Laurentic (T. & R.)	17	1927	Br.	White Star Line	578·2	75·4	40·6
18,495	Ceramic (T. & R.)	16	1913	Br.	White Star Line	655·1	69·4	43·8
18,452	Empress of France (T.)	19	1913	Br.	Canadian Pacific	571·4	72·4	41·7
18,435	De Grasse (T.)	16	1924	Fr.	C.G.T. (French Line)	552·1	71·4	42·3
18,372	Mount Vernon	23½	1906	U.S.	U.S. Shipping Board	685·4	72·2	40·5
18,298	Virginia (T.E.)	18	1928	U.S.	American Line S.S. Corp.	586·4	80·3	52·0
18,200	Pennsylvania (T.E.)	—	1929	U.S.	American Line S.S. Corp.	586·0	80·3	20·5
18,021	Lurline (T.)	22	1932	U.S.	Oceanic S.S. Co.	604·0	79·3	30·5
18,017	Mariposa (T.)	22	1931	U.S.	Oceanic S.S. Co.	604·0	79·3	30·5
18,017	Monterey (T.)	22	1932	U.S.	Oceanic S.S. Co.	604·0	79·3	30·5
17,856	Conte Rosso (T.)	19	1922	Ital.	Italia Line	588·2	74·2	35·9
17,817	California (T.E.)	18	1928	U.S.	American Line S.S. Corp.	574·4	80·3	52·0
17,801	Kosmos	—	1929	Nor.	Kosmos A/S.	554·1	77·2	49·6
17,707	Reina del Pacifico (M.)	19	1930	Br.	Pacific Stm. Nav. Co.	551·0	76·3	38·5
17,544	Gripsholm (M.)	17	1925	Swed.	Svenska-Amerika Line	553·0	74·4	37·7
17,537	Aramis (M.)	15½	1932	Fr.	Messageries Maritimes	543·5	69·6	33·6
17,498	Chichibu Maru (M.)	19	1930	Jap.	Nippon Yusen Kaisha	560·0	74·0	42·5
17,491	Aorangi (M.)	17	1924	Br.	Canadian-Australasian Line	580·1	72·2	43·4
17,281	Minnekahda (T. & R.)	16	1917	U.S.	Atlantic Transport Line	620·5	66·4	47·3
17,232	Malolo (T.)	22	1927	U.S.	Matson Nav. Co.	554·0	83·2	30·7
17,046	Caledonia (T.)	15½	1925	Br.	Anchor Line	553·0	70·4	38·7
16,991	Tuscania (T.)	15½	1922	Br.	Anchor Line	552·3	70·3	38·6
16,981	Baloeran (M.)	18	1929	Holl.	Rotterdam Lloyd	550·0	70·0	44·0
16,979	Dempo (M.)	18	1930	Holl.	Rotterdam Lloyd	550·0	70·0	44·0
16,975	Asama Maru (M.)	19	1928	Jap.	Nippon Yusen Kaisha	560·0	72·0	42·5
16,975	Tatsuta Maru (M.)	19	1929	Jap.	Nippon Yusen Kaisha	560·0	72·0	42·5
16,970	Cleveland (T. & R.)	15½	1908	Ger.	Hamburg-Amerika Line	588·9	65·3	46·7
16,966	Kosmos II.	—	1931	Nor.	Hvalf. "Kosmos II" A/S.	553·4	77·2	37·6
16,923	Transylvania (T.)	15½	1925	Br.	Anchor Line	552·4	70·3	30·3
16,909	Empress of Asia (T.)	20	1913	Br.	Canadian Pacific	570·1	68·2	42·0
16,810	Empress of Russia (T.)	20	1913	Br.	Canadian Pacific	570·2	68·2	42·0
16,792	California (T.)	15½	1923	Br.	Anchor Line	553·0	70·4	38·8
16,774	Felix Roussel (M.)	15	1929	Fr.	Messageries Maritimes	534·8	68·2	46·9
16,738	Ranchi (T. & R.)	18	1925	Br.	P. & O.	548·5	71·3	43·2
16,737	Rangitata (M.)	15	1929	Br.	Federal Steam Nav. Co.	531·0	70·2	31·8
16,732	St. Louis (M.)	16	1928	Ger.	Hamburg-Amerika Line	543·8	72·4	42·1
16,712	Rangitane (M.)	15	1929	Br.	New Zealand Shipping Co.	531·0	70·2	31·8
16,699	Milwaukee (M.)	16	1929	Ger.	Hamburg-Amerika Line	546·6	72·4	42·2
16,698	Rangitiki (M.)	15	1929	Br.	New Zealand Shipping Co.	531·0	70·2	38·1
16,697	Rawalpindi	17	1925	Br.	P. & O.	547·7	71·3	43·4
16,688	Ranpura	17	1925	Br.	P. & O.	548·3	71·3	43·2
16,644	Rajputana	17	1926	Br.	P. & O.	547·7	71·3	43·4
16,596	Mongolia (T.)	16	1923	Br.	P. & O.	551·6	72·0	38·5
16,572	Narkunda	17½	1920	Br.	P. & O.	581·4	69·4	27·7
16,556	Moldavia (T.)	16	1922	Br.	P. & O.	552·4	71·7	38·4
16,500	Westernland (T. & R.)	16	1918	Br.	F. Leyland & Co.	575·3	67·8	41·2
16,484	Doric (T.)	16	1923	Br.	White Star Line	575·5	67·9	41·2
16,436	C. O. Stillman (M.)	—	1928	Br.	International Petroleum Co.	565·7	75·6	44·5
16,418	Montcalm (T.)	17	1921	Br.	Canadian Pacific	549·5	70·2	40·2
16,402	Montrose (T.)	17	1922	Br.	Canadian Pacific	548·7	70·2	40·3
16,322	Pennland (T. & R.)	16	1922	Br.	F. Leyland & Co.	575·4	67·8	41·2
16,314	Montclare (T.)	17	1922	Br.	Canadian Pacific	549·5	70·2	40·2
16,297	Cameronia (T.)	15½	1920	Br.	Anchor Line	552·4	70·4	38·8
16,243	Lancastria (T.)	16½	1922	Br.	Cunard Line	552·8	70·4	38·8
16,088	Naldera	17½	1918	Br.	P. & O.	580·9	67·2	44·4
16,063	Calgaric (T. & R.)	15	1918	Br.	White Star Line	550·3	67·3	43·0
15,704	Christiaan Huygens (M.)	17	1927	Holl.	Nederland Stoom. Maats.	551·5	68·8	36·2

† * See notes on p. 345.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots.)	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
15,575	President Fillmore	16	1904	U.S.	Dollar S.S. Lines	600·0	65·3	31·1
15,551	Almanzora (T. & R.)	16	1914	Br.	Royal Mail	570·0	67·3	33·3
15,543	President Johnson	16	1904	U.S.	Dollar S.S. Lines	600·0	65·3	31·1
15,507	Orduña (T. & R.)	15	1914	Br.	Pacific Stm. Nav. Co.	550·3	67·3	43·0
15,495	Orbita (T. & R.)	15	1915	Br.	Pacific Stm. Nav. Co.	550·3	67·3	43·0
15,450	Veendam (T.)	16	1923	Holl.	Holland-Amerika Line	550·2	67·3	41·1
15,434	Volendam (T.)	15	1922	Holl.	Holland-Amerika Line	550·2	67·3	32·6
15,396	Chitral (T. & R.)	17	1925	Br.	P. & O.	526·3	70·3	42·3
15,363	Massilia (T. & R.)	20	1920	Fr.	Cie. de Nav. Sud Atlantique	577·1	64·1	37·0
15,357	Svealand (M.)	—	1925	Swed.	Angf. Akt. Tirfing	561·3	72·2	44·1
15,355	Amerikaland (M.)	—	1925	Swed.	Angf. Akt. Tirfing	561·3	72·2	44·1
15,286	Berlin	16½	1925	Ger.	Norddeutscher Lloyd	549·3	69·2	34·8
15,279	Comorin (T. & R.)	17	1925	Br.	P. & O.	523·5	70·2	42·3
15,276	Athos II (T.)	14	1925	Fr.	Messageries Maritimes	543·9	66·2	41·7
15,272	Cathay	16½	1925	Br.	P. & O.	523·5	70·2	42·3
15,186	Minnedosa (T. & R.)	16½	1918	Br.	Canadian Pacific	520·0	67·2	41·8
15,183	Melita (T. & R.)	16½	1918	Br.	Canadian Pacific	520·0	67·2	50·3
15,135	Atlantis (T. & R.)	16	1913	Br.	Royal Mail	570·3	67·3	33·3
15,128	Akaroa (T. & R.)	15	1914	Br.	Shaw, Savill & Albion	550·7	67·4	44·1
15,105	D'Artagnan	14	1924	Br.	Messageries Maritimes	543·5	65·0	41·4
14,982	Ormonde (T.)	17	1917	Fr.	Orient Line	580·5	66·7	40·5
14,825	Chenonceaux	13	1922	Fr.	Messageries Maritimes	543·4	65·1	41·1
14,783	Lutetia (T. & R.)	20	1913	Fr.	Cie. de Nav. Sud Atlantique	579·0	64·1	36·7
14,694	Arandora Star (T.)	16	1927	Br.	Blue Star Line	512·2	68·3	34·0
14,690	Dresden	15½	1914	Ger.	Norddeutscher Lloyd	550·0	67·3	35·1
14,690	General von Steuben (T. & R.)	16	1922	Ger.	Norddeutscher Lloyd	526·9	65·0	43·7
14,652	Ulysses	14	1913	Br.	Blue Funnel Line	563·2	68·4	40·2
14,629	Nestor	14	1913	Br.	Blue Funnel Line	563·2	68·4	31·2
14,622	Arlanza (T. & R.)	16	1912	Br.	Royal Mail	570·3	65·3	33·3
14,596	Svend Foyn	—	1931	Nor.	Hvalf. Sydhavet	538·1	74·3	33·4
14,577	Vestfold	—	1931	Nor.	Hvalf. Vestfold	538·1	74·3	33·4
14,526	Vikingen	—	1929	Panama	Viking Corpn. of Panama	493·0	71·1	50·0
14,457	Taiyo Maru	16	1911	Jap.	Nippon Yusen Kaisha	560·0	65·3	31·2
14 362	Sir James Clark Ross (M)	—	1930	Nor.	Hvalfanger A/S Rosshavet	537·9	74·3	34·4
14,305	Charles G. Black	—	1921	U.S.	Standard Oil Co.	550·3	72·2	43·7
14,304	Carthage (T.)	18	1931	Br.	P. & O.	522·5	71·4	33·1
14,293	Corfu (T.)	18	1931	Br.	P. & O.	522·5	71·4	33·1
14,198	Hobson's Bay (T.)	16	1922	Br.	Aberdeen-Commonwealth	530·6	68·3	39·9
14,187	President Lincoln (T.)	18	1921	U.S.	Dollar S.S. Lines	516·5	72·2	27·8
14,187	President Madison (T.)	18	1921	U.S.	American Mail Line	516·5	72·2	27·8
14,184	Largs Bay (T.)	16	1921	Br.	Aberdeen-Commonwealth	530·9	68·3	39·9
14,176	Esperance Bay (T.)	16	1922	Br.	Aberdeen-Commonwealth	530·9	68·3	39·9
14,174	President Jefferson (T.)	18	1920	U.S.	American Mail Line	516·5	72·2	27·8
14,164	Jervis Bay (T.)	16	1922	Br.	Aberdeen-Commonwealth	530·6	68·3	39·9
14,157	Highland Patriot (M.)	16	1932	Br.	Royal Mail (Nelson)	523·4	69·4	37·1
14,145	Moreton Bay (T.)	16	1921	Br.	Aberdeen-Commonwealth	530·6	68·3	39·9
14,137	Highland Monarch (M.)	16	1928	Br.	Royal Mail (Nelson)	523·4	69·4	37·1
14,131	Highland Chieftain (M.)	16	1929	Br.	Royal Mail (Nelson)	523·4	69·4	37·1
14,131	Highland Brigade (M.)	16	1929	Br.	Royal Mail (Nelson)	523·4	69·4	37·1
14,128	Highland Princess (M.)	16	1928	Br.	Royal Mail (Nelson)	523·4	69·4	37·1
14,127	President McKinley (T.)	18	1921	U.S.	American Mail Line	516·5	72·2	27·8
14,127	President Wilson (T.)	18	1921	U.S.	Dollar S.S. Lines	516·5	72·2	27·8
14,124	President Jackson (T.)	18	1921	U.S.	American Mail Line	517·0	72·2	27·8
14,123	President Cleveland (T.)	18	1921	U.S.	Dollar S.S. Lines	517·0	72·2	36·8
14,123	President Pierce (T.)	18	1921	U.S.	Dollar S.S. Lines	517·0	72·2	27·8
14,123	President Taft (T.)	18	1921	U.S.	Dollar S.S. Lines	517·0	72·2	27·8
14,119	President Grant (T.)	18	1921	U.S.	American Mail Line	517·0	72·2	27·8
14,075	Oropesa (T.)	15	1920	Br.	Pacific Stm. Nav. Co.	530·0	66·3	41·2
14,054	John D. Archbold	—	1921	U.S.	Standard Oil Co.	570·2	75·1	42·6
14,054	William Rockefeller	—	1921	U.S.	Standard Oil Co.	554·9	75·3	43·0
14,030	Alaunia (T.)	15	1925	Br.	Cunard Line	519·6	65·2	39·2
14,013	Ascania (T.)	15	1925	Br.	Cunard Line	520·0	65·3	39·0
13,984	Aurania (T.)	15	1924	Br.	Cunard Line	519·7	65·3	39·2
13,950	Andania (T.)	15	1922	Br.	Cunard Line	520·2	65·3	39·2
13,912	Ausonia (T.)	15	1921	Br.	Cunard Line	520·0	65·3	39·1
13,882	Monte Rosa (M.)	14½	1930	Ger.	Hamburg Sud-Amerika Line	500·3	65·7	37·8
13,870	Monte Pascoal (M.)	14½	1930	Ger.	Hamburg Sud-Amerika Line	500·3	65·7	37·8
13,869	President Harding (T.)	18	1921	U.S.	United States Lines	516·5	72·2	27·8
13,869	President Roosevelt (T.)	19	1922	U.S.	United States Lines	516·5	72·2	27·8
13,868	Gelria	16½	1913	Holl.	Holland Lloyd	541·1	65·8	35·3
13,867	Antonia (T.)	15	1921	Br.	Cunard Line	519·9	65·3	39·1
13,801	New Sevilla	12	1900	Br.	Sevilla Whaling Co.	550·2	63·3	39·9
13,797	Hektoria	13	1899	Nor.	A/S. Hektor	550·2	63·3	32·0
13,789	Southern Cross (T.)	18½	1920	U.S.	Munson S.S. Line	516·5	72·2	27·8
13,750	Monte Olivia (M.)	14½	1924	Ger.	Hamburg Sud-Amerika Line	500·6	65·8	37·9
13,736	American Legion (T.)	18½	1920	U.S.	Munson S.S. Line	516·5	72·2	27·8
13,712	Pan America (T.)	18½	1921	U.S.	Munson S.S. Line	517·0	72·2	27·8
13,712	Western World (T.)	18½	1921	U.S.	Munson S.S. Line	517·0	72·2	41·0

† * See notes on p. 345.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
13,682	André Lebon	14	1913	Fr.	Messageries Maritimes	508·2	61·6	45·8
13,640	Tafelberg	—	1930	Br.	Kerguelen Seal'g & Whal'g Co.	508·3	72·5	35·7
13,625	Monte Sarmiento (M.)	14½	1924	Ger.	Hamburg Sud-Amerika Line.	500·6	65·8	37·9
13,615	Sierra Salvada (T. & R.)	14½	1922	Ger.	Hamburg Sud-Amerika Line.	499·5	64·0	38·7
13,589	Sierra Nevada (T. & R.)	14½	1921	Ger.	Hamburg Sud-Amerika Line.	499·5	64·0	38·7
13,475	Letitia (T.)	15½	1925	Br.	Anchor-Donaldson	525·7	66·4	29·5
13,465	Athenia (T.)	15½	1923	Br.	Anchor-Donaldson	526·3	66·4	38·1
13,415	Niagara (T. & R.)	16	1913	Br.	Canadian Australasian Line	524·7	66·3	34·5
13,391	Colombie (T.)	15½	1931	Fr.	C.G.T. (French Line)	428·8	66·4	46·2
13,387	Stuttgart	16	1923	Ger.	Norddeutscher Lloyd	527·0	65·0	34·7
13,376	Avelona Star (T.)	16	1927	Br.	Blue Star Line	510·2	68·2	42·6
13,363	Balmoral Castle	17	1910	Br.	Union Castle Line	570·0	64·5	38·9
13,329	Edinburgh Castle	17	1910	Br.	Union Castle Line.	570·2	64·7	38·7
13,248	Voltaire	14½	1923	Br.	Lamport & Holt	510·6	64·3	39·3
13,247	Juvenal	—	1928	Arg.	Cia. Gen. de Combustibles	556·0	74·1	40·3
13,246	C. A. Larsen	—	1913	Nor.	Hvalfanger A/S. Rosshavet	527·2	66·6	33·9
13,233	Vandyck (T.)	14½	1921	Br.	Lamport & Holt	510·6	64·3	39·3
13,156	Stavangerfjord (T. & R.)	17½	1918	Nor.	Norske-Amerika Line	532·5	64·2	29·3
13,072	Baradine (T. & R.)	15½	1921	Br.	P. & O.	519·9	64·4	37·8
13,068	Victoria (M.)	20½	1931	Ital.	Lloyd Triestino	540·6	69·9	30·9
13,062	Barrabool (T. & R.)	15½	1922	Br.	P. & O.	519·9	64·4	37·8
13,056	San Fernando (T.)	14	1919	Br.	Eagle Oil Transport Co.	530·4	69·4	42·2
13,037	San Felix (T.)	11	1921	Br.	Eagle Oil Transport Co.	530·4	69·4	42·2
13,031	San Fabian (T.)	11	1922	Br.	Eagle Oil Transport Co.	530·5	69·4	42·0
13,026	Shinyo Maru (T.)	16	1911	Jap.	Nippon Yusen Kaisha	558·0	61·9	35·5
12,999	Armadale Castle	17	1903	Br.	Union Castle Line	570·1	64·5	39·0
12,996	Ballarat (T. & R.)	15½	1921	Br.	P. & O.	519·8	64·2	37·8
12,995	Ausonia (T.)	21	1928	Ital.	Lloyd Triestino	517·3	66·4	39·2
12,990	Balranald (T. & R.)	15½	1922	Br.	P. & O.	519·8	64·2	29·8
12,975	Kenilworth Castle	17	1904	Br.	Union Castle Line	570·2	64·7	38·7
12,972	Bendigo (T. & R.)	15½	1922	Br.	P. & O.	519·8	64·2	37·8
12,951	California (T.)	14	1920	Ital.	Nav. Libera Triestina	523·1	64·0	43·9
12,915	San Gerardo (T.)	1	1922	Br.	Eagle Oil Transport Co.	530·2	68·5	42·1
12,910	San Gaspar (T.)	1	1921	Br.	Eagle Oil Transport Co.	530·2	68·5	42·1
12,872	Avila Star (T.)	16	1927	Br.	Blue Star Line	510·2	68·2	33·0
12,848	Almeda Star (T.)	16	1926	Br.	Blue Star Line	512·2	68·3	34·0
12,846	Andalucia Star (T.)	16	1927	Br.	Blue Star Line	512·2	68·3	34·0
12.842	San Florentino (T.)	—	1919	Br.	Eagle Oil Transport Co.	530·4	68·6	42·0
12,700	President Doumer (M.)	—	1933	Fr.	Messageries Maritimes	467·0	64·0	40·4
12,692	Porthos	13½	1914	Fr.	Messageries Maritimes	510·8	61·6	42·1
12,678	Rochambeau (T. & R.)	15	1911	Fr.	C.G.T. (French Line)	559·4	63·7	43·3
12,642	City of Los Angeles (T.)	16	1899	U.S.	Los Angeles S.S. Co.	560·6	62·3	35·9
12,510	Gulfpride (M.)	—	1927	U.S.	Gulf Refining Co.	525·0	74·3	31·6
12,442	Geo. W. McKnight (M.)	12	1933	Danzig	Baltisch-Amer. Petrol. Import	521·7	70·4	38·7
12,432	F. J. Wolfe (M.)	12	1932	Danzig	Baltisch-Amer. Petrol. Import	521·4	70·3	38·6
12,425	R. L. Hague (M.)	12	1932	Danzig	Baltisch-Amer. Petrol. Import	522·0	70·2	38·7
12,425	Franz Klasen (M.)	12	1932	Danzig	Baltisch-Amer. Petrol. Import	521·4	70·4	38·7
12,424	Victor Ross (M.)	12	1933	Danzig	Baltisch-Amer. Petrol. Import	521·4	70·3	38·6
12,421	Orville Harden (M.)	—	1933	Danzig	Deutsch-Amer. Petrol. Import	522·0	70 4	38·7
12,420	Marguerite Finaly (M.)	—	1933	Fr.	Soc. Aux. des Transports	522·0	—	—
12,420	Metagama	16	1915	Br.	Canadian Pacific	500·4	64·2	37·9
12,400	Robert F. Hand (M.)	—	1933	Danzig	Baltisch-Amer. Petrol. Import	520·0	69·8	38·7
12,385	Saxon	17	1900	Br.	Union Castle Line	570·5	64·4	38·6
12,358	Skytteren	13	1901	Nor.	A/S. Skytteren	550·2	63·3	39·9
12,354	Tamaroa (T.)	15	1922	Br.	Aberdeen Line	500·4	63·2	39·6
12,353	Southern Empress	11	1914	Br.	Southn. Whaling & Sealing Co.	525·5	66·5	33·9
12,352	Ionic	13	1902	Br.	White Star Line	500·3	63·3	45·0
12,333	Mataroa (T.)	15	1922	Br.	Aberdeen Line	500·4	63·2	39·6
12,323	J. A. Mowinckel (M.)	12	1930	Danzig	Baltisch-Amer. Petrol. Import	521·8	70·4	38·8
12,306	Sultan Star (T.)	16	1930	Br.	Blue Star Line	486·1	70·2	36·6
12,286	San Melito	—	1914	Br.	Eagle Oil Transport Co.	530·0	66·5	33·5
12,275	Cabo San Antonio (M.)	—	1930	Sp.	Ybarra & Co.	482·5	63·4	33·4
12,272	Gange	18	1912	Ital.	Lloyd Triestino	477·5	60·2	43·2
12,263	Champollion	15	1924	Fr.	Messageries Maritimes	495·1	62·7	40·5
12,257	Oroya (T.)	14	1923	Br.	Pacific Steam Nav. Co.	525·3	62·8	32·1
12,246	Solglimt	15½	1900	Nor.	Hvalfangerselsk. Atlas A/S.	547·1	62·1	34·6
12,239	Mariette Pacha	15	1925	Fr.	Messageries Maritimes	508·5	62·6	43·6
12,220	Mexique (T. & R.)	16	1915	Fr.	C.G.T. (French Line)	546·7	64·0	34·8
12.215	Thorshammer	11	1914	Nor.	Bryde & Dahls Hvalf. A/S.	525·5	66·5	41·4
12,201	Ole Wegger	11	1914	Nor.	A/S. Ornen	527·1	66·6	42·1
12,200	D. L. Harper (M.)	—	1932	Danzig	Baltisch-Amer. Petrol. Import	519·8	70·0	38·7
12,185	J. H. Senior (M.)	12	1931	Danzig	Baltisch-Amer. Petrol. Import	521·2	70·3	38·9
12,175	Heinrich v. Riedemann (M.)	12	1930	Danzig	Baltisch-Amer. Petrol. Import	521·1	70·2	38·8
12,092	Southern Princess	—	1915	Br.	Southn. Whaling & Sealing Co.	530·0	66·6	33·5
12,076	Cadillac	10½	1917	Br.	Anglo-American Oil Co.	530·2	66·3	33·8
12,074	Saranac	10½	1918	Br.	Anglo-American Oil Co.	530·5	66·3	42·7
12,067	Pelagos	13	1901	Nor.	Hvalfangerselsk. Pelagos A/S.	500·3	63 8	45·0
12,050	Cordillera (M.)	—	1933	Ger.	Hamburg-Amerika Line	497·8	65·9	27·8
12,049	Caribia (M.)	16½	1932	Ger.	Hamburg-Amerika Line	497·8	65·8	27·9

† * See notes on p. 345.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
12,043	Peter Hurll (M.)	12	1930	Danzig	Baltisch-Amer. Petrol. Import	521·2	70·2	38·7
12,041	Orsova	17	1909	Br.	Orient Line	536·2	63·3	34·3
12,040	Sibajak (M.)	16½	1927	Holl.	Rotterdam Lloyd	506·6	62·7	35·2
12,003	Colombo	16	1917	Ital.	Italia Line	518·0	64·0	24·2
11,999	Athelcrown (M.)	—	1929	Br.	United Molasses Co.	526·5	68·8	38·9
11,996	Providence	15	1915	Fr.	Cie. Fr. de N. (Cyp. Fabre)	511·8	59·7	43·5
11,952	F. H. Bedford, Jr. (M.)	12	1930	Danzig	Baltisch-Amer. Petrol. Import	521·4	70·2	38·7
11,951	Llangibby Castle (M.)	15½	1929	Br.	Union Castle Line	486·0	66·2	27·8
11,941	Calgorolite (M.)	—	1928	Br.	Imperial Oil	522·0	70·3	38·7
11,938	Salvestria	12	1913	Br.	South Georgia Co.	500·3	62·4	34·6
11,930	Terukuni Maru (M.)	16½	1930	Jap.	Nippon Yusen Kaisha	507·0	64·0	37·0
11,930	Yasukuni Maru (M.)	16½	1930	Jap.	Nippon Yusen Kaisha	505·0	64·0	37·0
11,885	Patria	15	1913	Fr.	Cie. Fr. de N. (Cyp. Fabre)	487·2	59·2	40·1
11,884	Stuart Star (T.)	15	1926	Br.	Blue Star Line	475·8	67·3	36·6
11,868	Cabo San Agustin (M.)	—	1931	Sp.	Ybarra & Co.	482·5	63·4	33·4
11,868	Cabo Santo Tome (M.)	—	1931	Sp.	Ybarra & Co.	482·5	63·4	33·4
11,867	Afric Star (T.)	15	1926	Br.	Blue Star Line	475·8	67·3	36·6
11,850	Frederik VIII.	17	1913	Dan.	Forenede Damps. S.	523·5	62·3	38·3
11,814	Korea Maru	16	1901	Jap.	Nippon Yusen Kaisha	551·7	63·2	40·8
11,814	Siberia Maru	16	1901	Jap.	Nippon Yusen Kaisha	551·7	63·2	21·8
11,803	Rodney Star (T.)	15	1927	Br.	Blue Star Line	476·9	67·3	36·6
11,753	W. S. Farish (T.)	—	1930	U.S.	Standard Shipping Co.	525·0	74·3	40·5
11,752	G. Harrison Smith (T.)	—	1930	U.S.	Standard Shipping Co.	525·0	74·3	40·5
11,732	Marechal Joffre (M.)	—	1933	Fr.	Messageries Maritimes	468·7	64·0	37·9
11,718	Virgilio (M.)	15	1927	Ital.	Italia Line	482·2	61·9	33·4
11,669	Orazio (M.)	15	1927	Ital.	Italia Line	482·2	61·9	33·4
11,636	Slamat (T.)	17	1923	Holl.	Rotterdam Lloyd	482·5	62·0	35·0
11,628	Australia (M.)	—	1928	U.S.	Texas S.S. Co.	509·7	60·2	39·9
11,622	Hikawa Maru (M.)	17	1930	Jap.	Nippon Yusen Kaisha	510·0	66·0	41·0
11,621	Hiye Maru (M.)	17	1930	Jap.	Nippon Yusen Kaisha	512·6	66·0	41·0
11,616	Heian Maru (M.)	17	1930	Jap.	Nippon Yusen Kaisha	511·6	66·0	41·0
11,590	General Osorio (M.)	15	1928	Ger.	Hamburg-Amerika Line	498·5	66·0	32·8
11,555	Northumberland (T.)	15	1915	Br.	Federal Stm. Nav. Co.	530·5	63·0	31·9
11,520	Morro Castle (T.E.)	20	1930	U.S.	Atlantic, Gulf & W. Indies Lines	508·0	70·9	39·0
11,520	Oriente (T.E.)	20	1930	U.S.	Atlantic, Gulf & W. Indies Lines	508·0	70·9	39·0
11,518	Kaisar-i-Hind	17	1914	Br.	P. & O.	520·0	61·2	33·1
11,493	Darro	13	1912	Br.	Royal Mail	500·7	62·3	40·2
11,484	Demerara	13	1912	Br.	Royal Mail	500·7	62·3	40·2
11,475	Deseado	13	1912	Br.	Royal Mail	500·7	62·3	40·2
11,469	Sierra Cordoba	14½	1923	Ger.	Norddeutscher Lloyd	490·5	61·8	34·3
11,453	Worcestershire (M.)	15½	1931	Br.	Bibby Line	483·0	64·2	32·0
11,449	Tuscan Star (M.)	16	1930	Br.	Blue Star Line	471·0	68·3	35·1
11,439	Transbalt	12	1899	Russ.	Soviet Mercantile Fleet	501·1	62·2	46·3
11,431	Philoctetes (T.)	14	1922	Br.	Blue Funnel Line	511·9	63·2	41·1
11,430	Sierra Morena	14½	1924	Ger.	Norddeutscher Lloyd	490·5	61·8	34·3
11,414	Jean Laborde (M.)	15	1930	Fr.	Messageries Maritimes	463·6	61·8	28·3
11,410	Victolite (M.)	—	1928	Br.	Imperial Oil	510·2	68·2	38·0
11,405	Esperia (T.)	21	1918	Ital.	Lloyd Triestino	492·1	61·7	34·1
11,404	Vancolite (M.)	—	1928	Br.	Imperial Oil	510·2	68·2	38·0
11,404	Achilles (T.)	14	1920	Br.	Blue Funnel Line	507·4	63·2	41·1
11,395	Harry G. Seidel (M.)	—	1930	Danzig	Baltisch-Amer. Petrol. Import	513·2	68·1	39·4
11,392	Sierra Ventana	14½	1923	Ger.	Norddeutscher Lloyd	490·5	61·8	34·3
11,383	Remuera	14	1911	Br.	New Zealand Shipping Co.	485·0	62·3	41·0
11,375	Sphinx	14	1914	Fr.	Messageries Maritimes	478·0	60·7	40·6
11,347	Tyndareus	13½	1916	Br.	Blue Funnel Line	507·0	63·2	41·6
11,337	Cuba (T.)	15½	1923	Fr.	C.G.T. (French Line)	476·0	62·3	35·1
11,321	Sarpedon (T.)	15	1923	Br.	Blue Funnel Line	499·0	62·3	34·9
11,314	Patroclus (T.)	15	1923	Br.	Blue Funnel Line	498·8	62·3	26·4
11,309	Montrolite (M.)	—	1926	Br.	Imperial Oil	510·9	68·2	37·9
11,309	Canadolite (M.)	—	1926	Br.	Imperial Oil	510·0	68·0	38·0
11,299	Llanstephan Castle	14	1914	Br.	Union Castle Line	500·5	63·3	37·2
11,256	Leopoldville	14	1929	Belg.	Lloyd Royal Belge	478·8	62·2	35·0
11,254	General Artigas (T.)	13½	1923	Ger.	Hamburg-Amerika Line	473·6	60·7	41·9
11,251	General San Martin (T.)	13½	1922	Ger.	Hamburg-Amerika Line	473·6	60·7	41·9
11,246	California Standard (M.)	—	1929	U.S.	Standard Oil Co. of California	513·5	68·1	39·5
11,245	Hororata	14	1914	Br.	New Zealand Shipping Co.	511·1	64·2	32·0
11,231	Themistocles	15	1911	Br.	Aberdeen Line	500·6	62·3	39·4
11,202	Berrima	—	1913	—	———	500·1	62·2	37·8
11,198	Hector (T.)	15	1924	Br.	Blue Funnel Line	498·8	62·3	26·4
11,174	Antenor (T.)	15	1925	Br.	Blue Funnel Line	497·7	62·2	35·0
11,155	Espagne	15½	1909	Fr.	C.G.T. (French Line)	537·8	60·8	39·0
11,140	Jan Pieterszoon Coen	15	1915	Holl.	Nederland Stoom. Maats.	503·5	60·6	35·8
11,103	Edison	13	1896	Gr.	National Stm. Nav. Co. of Greece	523·1	60·1	34·9
11,081	Achilles	—	1915	U.S.	Panama Canal	514·0	65·2	36·5
11,060	Nieuw Zeeland (T.)	15	1928	Holl.	Koninkl. Paketv. Maats.	540·0	62·5	33·4
11,057	Nieuw Holland (T.)	15	1927	Holl.	Koninkl. Paketv. Maats.	540·5	62·7	32·3

† * See notes on p. 345.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft).
11,055	Drottningholm (T.)	16½	1905	Swed.	Svenska-Amerika Line	517·0	60·0	38·0
11,028	Foucauld	14	1922	Fr.	Chargeurs Réunis	483·4	58·9	34·9
11,015	Bergensfjord (T. & R.)	17½	1913	Nor.	Norske-Amerika Line	512·4	61·2	29·4
10,948	Norfolk (T. & R.)	14	1918	Br.	Federal Stm. Nav. Co.	520·7	64·2	38·1
10,946	Huntingdon (T. & R.)	14	1920	Br.	Federal Stm. Nav. Co.	520·7	64·2	38·1
10,946	Mantua	16	1909	Br.	P. & O.	540·0	61·3	24·6
10,940	Cornwall (T.)	14	1920	Br.	Federal Stm. Nav. Co.	495·1	63·1	40·3
10,938	Cumberland (T. & R.)	14	1919	Br.	Federal Stm. Nav. Co.	520·0	64·2	29·0
10,936	Fushimi Maru	14½	1914	Jap.	Nippon Yusen Kaisha	513·0	63·5	37·5
10,926	Eastern Prince (M.)	17	1929	Br.	Prince Line	496·2	64·8	35·4
10,926	Western Prince (M.)	17	1929	Br.	Prince Line	496·2	64·8	35·4
10,923	Hertford (T. & R.)	14	1917	Br.	Federal Stm. Nav. Co.	520·7	64·2	38·1
10,917	Northern Prince (M.)	17	1929	Br.	Prince Line	496·2	64·9	25·9
10,917	Southern Prince (M.)	17	1929	Br.	Prince Line	496·2	64·9	25·9
10,902	City of Paris (T.)	14½	1922	Br.	City Line	484·7	59·3	32·6
10,893	Chief Capilano	13	1920	Br.	Canadian-American Nav. Co.	523·5	65·7	37·5
10,890	Rotorua	15	1911	Br.	Federal Stm. Nav. Co.	526·4	61·4	33·3
10,870	Ruahine	14	1909	Br.	New Zealand Shipping Co.	480·6	60·3	32·1
10,852	Monowai (T. & R.)	20	1925	Br.	Union Royal Mail Line	500·4	63·2	34·0
10,846	Cambridge	14	1916	Br.	Federal Stm. Nav. Co.	524·5	65·7	37·3
10,836	Tjibesar (T.)	12	1922	Holl.	Java-China-Japan Line	500·1	63·7	39·2
10,833	Cristobal Colon (T.)	17	1922	Sp.	Cia. Trasatlantica	499·4	61·0	32·3
10,829	F. H. Hillman	—	1921	U.S.	Standard Oil Co. of California	500·0	68·2	30·0
10,816	Campana (T.)	15	1929	Fr.	Soc. Gen. de Transport Mar. à Vap.	510·6	67·0	32·1
10,786	Llandaff Castle	14½	1926	Br.	Union Castle Line	471·1	61·7	39·0
10,782	Colombia (M.)	15	1930	Holl.	Koninkl. Nederlandsche S.M.	429·5	61·7	36·0
10,780	Ulysses	—	1915	U.S.	American Tankers Corp.	514·0	65·2	36·5
10,769	Albertville	14	1928	Belg.	Lloyd Royal Belge	494·1	62·0	24·0
10,746	Indrapoera (M.)	16½	1925	Holl.	Rotterdam Lloyd	479·5	60·2	35·1
10,725	Andrea F. Luckenbach (T.)	13	1919	U.S.	Luckenbach S.S. Co.	496·0	68·2	37·2
10,672	Suwa Maru	14½	1914	Jap.	Nippon Yusen Kaisha	516·0	62·6	34·9
10,662	Lewis Luckenbach (T.)	13	1919	U.S.	Luckenbach S.S. Co.	496·0	68·0	40·0
10,654	Staffordshire (M.)	15½	1928	Br.	Bibby Line	483·6	62·3	32·0
10,609	Llandovery Castle	14½	1925	Br.	Union Castle Line	471·1	61·7	39·0
10,583	Napier Star (T.)	15	1927	Br.	Blue Star Line	476·0	67·3	36·6
10,560	Shropshire (M.)	15½	1926	Br.	Bibby Line	483·6	60·3	31·8
10,560	Cheshire (M.)	15½	1927	Br.	Bibby Line	483·6	60·3	31·8
10,551	Habana (T.)	17	1921	Sp.	Cia. Trasatlantica	480·0	61·0	32·3
10,533	President Hayes	14	1920	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,533	President Monroe	14	1920	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,533	President Van Buren	14	1920	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,517	Danmark (M.)	—	1931	Dan.	A/S. Dampsks. "Myren"	489.5	67·5	37·7
10,516	President Adams	14	1921	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,504	President Harrison	14	1921	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,502	Guadeloupe	13½	1908	Fr.	C.G.T. (French Line)	508·4	57·8	39·5
10,500	President Polk	14	1921	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,495	President Garfield	14	1921	U.S.	Dollar S.S. Lines	502·1	62·2	28·3
10,480	Lemoyne	—	1926	Br.	Canada S.S. Line	621·1	70·2	25·4
10,441	Doric Star (T.)	12	1921	Br.	Blue Star Line	499·8	64·0	37·0
10,421	Haruna Maru (T.)	15½	1922	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,420	Hakone Maru (T.)	15½	1921	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,413	Hakozaki Maru (T.)	15½	1922	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,409	Pan Gothia (M.)	—	1931	Swed.	Rederi. Oil Transport	—	—	—
10,388	California	—	1921	U.S.	Texas S.S. Co.	500·0	68·2	29·3
10,388	Beacon	—	1921	U.S.	Standard Shipping Co.	500·0	68·2	29·3
10,380	Hakusan Maru (T.)	15½	1923	Jap.	Nippon Yusen Kaisha	495·0	62·0	37·0
10,374	Diomed (T.)	14	1922	Br.	Blue Funnel Line	491·0	62·4	31·1
10,355	Johan de Witt	15	1920	Holl.	Nederland Stoom. Maats.	482·2	59·2	34·8
10,353	Wilhelm A. Riedemann (M.)	—	1920	Danzig	Baltisch-Amer. Petrol. Import	525·7	66·5	33·5
10,348	Uruguay (T. & R.)	17	1913	Sp.	Cia. Trasatlantica	481·9	61·3	32·7
10,305	Calchas (T.)	14	1921	Br.	Blue Funnel Line	490·8	62·4	39·6
10,286	Perseus (T.)	14	1923	Br.	Blue Funnel Line	490·5	62·3	39·6
10,283	Menelaus (T.)	14	1923	Br.	Blue Funnel Line	495·5	62·3	39·6
10,268	Explorateur Grandidier	13	1924	Fr.	Messageries Maritimes	455·8	60·7	41·1
10,229	Ixion	12	1912	Br.	Blue Funnel Line	506·0	60·3	39·5
10,227	Tamiahua	—	1921	U.S.	Southern Pacific S.S. Lines	500·0	71·2	31·2
10,224	Talthybius	13	1912	Br.	Blue Funnel Line	506·0	60·3	39·5
10,224	Europa (M.)	15	1931	Dan.	East Asiatic Co.	465·4	62·2	37·2
10,220	Delftdijk (M.)	15	1929	Holl.	Holland-Amerika Line	490·9	64·7	34·1
10,208	Gulfbird (M.)	—	1928	U.S.	Gulf Refining Co.	511·7	69·5	36·7
10,208	Gulfhawk (M.)	—	1928	U.S.	Gulf Refining Co.	511·7	69·5	36·7
10,208	Gulfwing (M.)	—	1928	U.S.	Gulf Refining Co.	511·7	69·5	36·7
10,196	Kraljica Marija	15	1906	Jugosl.	Jugoslavenski Lloyd	515·2	61·3	30·5
10,193	Brazza (M.)	13½	1923	Fr.	Chargeurs Réunis	453·1	59·1	36·1
10,191	Gretafield	—	1928	Br.	N. Petroleum Tank S.S. Co.	500·2	67·9	36·9
10,184	Yorkshire (T.)	15	1920	Br.	Bibby Line	482·4	58·3	40·4
10,171	Flandria (T.)	14½	1922	Holl.	Holland Lloyd	450·1	59·2	41·7
10,155	Damsterdijk (M.)	15	1930	Holl.	Holland-Amerika Line	490·9	64·7	34·1

† * See notes on p. 345.

LARGEST MERCHANT VESSELS OF THE WORLD—*continued.*

Gross tonnage.	Name.	Speed † (knots).	Date built.	Flag.	Owners.	L.* (ft.)	B.* (ft.)	D.* (ft.)
10,137	Argentina (T. & R.)	17	1913	Sp.	Cia. Trasatlantica	480·0	61·3	40·7
10,136	City of Nagpur	14	1922	Br.	City Line	469·9	59·3	40·0
10,123	Kerguelen (T.)	13½	1922	Fr.	Chargeurs Réunis	484·2	59·3	35·0
10,123	Jamaique (T.)	13½	1922	Fr.	Chargeurs Réunis	484·2	59·3	27·2
10,110	Amerika (M.)	15	1930	Dan.	East Asiatic Co.	465·4	62·2	37·2
10,107	Opawa (M.)	16	1931	Br.	New Zealand Shipping Co.	471·0	67·3	36·8
10,107	Orari (M.)	16	1931	Br.	New Zealand Shipping Co.	471·0	67·3	36·8
10,107	Sourabaya	12	1915	Br.	South Georgia Co.	470·2	58·3	32·2
10,086	Bernardin de Saint Pierre (T.)	13	1925	Fr.	Messageries Maritimes	455·8	60·8	41·0
10,078	Arctic Queen	12	1909	Br.	Hellyer Bros.	486·0	59·3	27·4
10,061	Commissaire Ramel (T. & R.)	12½	1920	Fr.	Messageries Maritimes	478·8	59·2	33·4
10,058	Aeneas	13½	1910	Br.	Blue Funnel Line	493·0	60·4	28·6
10,051	Koll (M.)	—	1930	Nor.	Odd Bergs Tankrederi	487·4	66·0	37·3
10,048	Ascanius	13½	1910	Br.	Blue Funnel Line	493·0	60·4	28·6
10,048	Otaio (M.)	16	1930	Br.	N.Z. Shipping Co.	472·2	67·2	35·7
10,042	Beaverford (T.)	15½	1928	Br.	Canadian Pacific	503·0	61·8	37·5
10,041	Beaverhill (T.)	15½	1928	Br.	Canadian Pacific	503·0	61·8	37·5
10,028	Carl D. Bradley (T.E.)	—	1927	U.S.	Bradley Transportation Co.	623·2	65·2	30·2
10,012	Oscar II.	15½	1901	Dan.	Forenede Damps. S.	500·8	58·3	37·6
10,006	Tilawa	12	1924	Br.	British India S.N. Co.	451·0	59·3	36·8
10,002	Dunbar Castle (M.)	14½	1930	Br.	Union Castle Line	471·2	61·2	29·6
10,000	Anchises	13½	1911	Br.	Blue Funnel Line	493·0	60·4	28·6
10,000	Talma	12	1923	Br.	British India S. N. Co.	451·0	59·3	36·8

† * See notes on p. 345.

NUMBERS OF VESSELS CLASSED BY VARIOUS CLASSIFICATION SOCIETIES.*

Society.	1913.	1919.	1923.	1925.	1928.	1932.	1933.
Lloyd's Register	10,466	9175	10,296	9973	10,077	10,575	10,117
British Corporation	876	1002	1306	1253	1417	1602	1536
American Bureau of Shipping: Record of American and Foreign Shipping	846	926	2392	2131	1928	1863	1727
American Bureau of Shipping: Gt. Lakes Register	572	442	416	383	383	359	375
Bureau Veritas	5165	5706	4998	5135	5097	5113	5132
Norske Veritas	1604	955	1242	1220	1307	1309	1393
Registro Italiano	1442	699	1872	1826	1693	2243	2234
Germanischer Lloyd	2848	†	2799	2855	2914	3034	2951

* Many vessels, of course, are not exclusively classed in one Register.
† No data available.

NUMBERS OF MERCHANT VESSELS OF VARIOUS SPEEDS.†

Speed.	Number. 1910.	1922.	1926.	1930.	1932.	1933.	Speed.	Number. 1910.	1922.	1926.	1930.	1932.	1933.
26 knots and over	—	—	—	2	2	2	17 knots	83	88	120	103	107	103
25 „ to 26	—	8	8	7	7	8	16½ „	45	44	51	43	41	45
24 „ 25	—	9	6	2	4	4	16 „	126	131	162	181	181	176
23 „ 24	—	5	9	11	12	15	15½ „	47	35	52	75	76	81
22 „ 23	—	17	15	16	16	20	15 „	215	185	205	217	246	241
21 „ 22	—	20	14	31	41	36	14½ „	85	81	100	129	141	140
20 „ 21	105*	32	42	39	39	46	14 „	276	289	327	335	336	318
19 „ 20	42	26	28	40	38	52	13½ „	138	170	169	205	231	220
18½ knots	24	18	20	24	27	12	13 „	462	458	451	488	446	483
18 „	60	54	50	67	82	86	12½ „	206	153	211	220	264	244
17½ „	48	36	22	20	22	21	12 „	732	790	918	865	855	823

* This figure includes all merchant steamers of 20 knots and over in existence in 1910.
† The speeds used in compiling these tables are as given by the owners.

FASTEST MERCHANT VESSELS OF THE WORLD.†

Speed (knots).	Name.	Gross Tonnage.	Date built.	Flag.	Owners.	L.* (ft.).	B.* (ft.).	D.* (ft.).
26 and over	Bremen	51,656	1929	German	Norddeutscher Lloyd	898·7	101·9	48·2
	Europa	49,746	1928	"	"	890·2	102·1	48·0
25 and under 26	Majestic	56,621	1921	British	White Star Line	915·5	100·1	58·2
	Mauretania	30,696	1907	"	Cunard Line	762·2	88·0	57·1
	Anglia	3,460	1920	"	L.M.S. Railway Co.	380·5	45·2	17·2
	Hibernia	3,458	1920	"	"	380·6	45·2	17·2
	Cambria	3,445	1921	"	"	380·6	45·2	17·2
	Scotia	3,441	1921	"	"	380·5	45·2	17·2
	Worthing	2,288	1928	"	Southern Railway Co.	297·7	38·7	15·0
	Paris	1,774	1913	"	"	293·5	35·6	15·2
24 and under 25	Empress of Britain	42,348	1931	"	Canadian Pacific Railway	733·3	97·8	56·0
	Leviathan	48,943	1914	U.S.	United States Lines	907·6	100·3	58·2
	Versailles	1,903	1919	French	French State Railways (Southern Railway Co.)	300·6	36·1	21·4
	Rouen	1,656	1912	"	"	292·0	34·6	22·1
23 and under 24	Berengaria	52,101	1912	British	Cunard Line	883·6	98·3	57·1
	Aquitania	45,647	1914	"	"	868·7	97·0	49·7
	Ile de France	43,153	1926	French	Cie. Gen. Transatlantique	763·7	92·0	55·9
	Maid of Orleans	2,386	1918	British	Southern Railway Co.	341·1	42·1	16·0
	Engadine	1,786	1911	"	"	316·0	41·1	15·8
	Newhaven	1,656	1911	French	French State Railways (Southern Railway Co.)	292·0	34·6	22·1
	Lady of Mann	3,104	1930	British	Isle of Man Stm. Packet Co.	363·6	50·2	17·4
	H. F. Alexander	8,357	1915	U.S.	Admiral Line	509·5	63·1	21·0
	Monticello	19,361	1902	"	U.S. Shipping Board	684·3	72·3	40·2
	Mount Vernon	18,372	1906	"	"	685·4	72·2	40·5
	Prince Charles	2,938	1930	Belg.	Belgian Government	347·0	46·2	22·8
	Prince Leopold	2,938	1930	"	"	347·0	46·2	22·8
	Prinses Astrid	2,938	1930	"	"	347·0	46·2	22·8
	Prinses Josephine Charlotte	2,938	1931	"	"	347·0	46·2	22·8
	Princesse Marie Jose	1,821	1922	"	"	348·0	40·0	23·3
22 and under 23	Olympic	46,439	1911	British	White Star Line	852·5	92·5	59·5
	France	23,769	1912	French	Cie. Gen. Transatlantique	690·1	75·6	48·5
	Ben-my-Chree	2,586	1927	British	Isle of Man Stm.PacketCo.	355·0	46·1	17·4
	Viking	1,957	1905	"	"	350·4	42·0	16·1
	Biarritz	2,388	1915	"	Southern Railway Co.	341·2	42·1	24·0
	Canterbury	2,910	1929	"	"	329·6	47·1	16·9
	Isle of Thanet	2,701	1925	"	"	329·5	45·1	47·1
	Maid of Kent	2,693	1925	"	"	329·5	45·1	17·1
	Prinses Juliana	2,908	1920	Dutch	Stoomvaart Maat-	350·4	42·7	23·9
	Mecklenburg	2,907	1922	"	schappij "Zeeland"	350·4	42·7	23·9
	Oranje Nassau	2,885	1909	"	"	350·0	42·7	16·4
	Wahine	4,436	1913	British	Union S.S. Co. of N.Z.	375·0	52·2	25·6
	Prince David	6,892	1930	"	Canadian National	366·4	57·1	18·9
	Prince Henry	6,893	1930	"	Railways	366·4	57·1	27·4
	Prince Robert	6,892	1930	"		366·4	57·1	27·4
	Malolo	17,232	1927	U.S.	Matson Navigation Co.	554·0	83·2	30·7
	Mariposa	18,017	1931	"	Oceanic S.S. Co.	604·0	79·3	30·5
	Lurline	18,021	1932	"	"	604·0	79·3	30·5
	Monterey	18,017	1932	"	"	604·0	79·3	30·5
	Rangatira	6,152	1931	British	Union Royal Mail Line	406·1	58·2	25·8

* Registered dimensions; see note on p. 345. † The speeds used in compiling this table are as given by the owners.

PARTICULARS OF FAST VOYAGES ON CERTAIN PASSENGER SERVICES.

Name of Vessel.	Owners.	Date of Voyage.	Ports between which Voyage was made.	Distance (Sea miles).	Time taken.	Average speed (Knots).	Best day's run (Knots).
Bremen . .	Norddeutscher Lloyd	July, 1929	Cherbourg to New York *	—	4d. 16h. 43m.	—	—
"	" "	July, 1929	New York to Cherbourg *	3,084	4d. 14h. 30m.	27·91	667
"	" "	June, 1933	New York to Cherbourg *	3,199	4d. 16h. 15m.	28·51	—
Europa . . .	" "	March, 1930	Cherbourg to New York *	3,157	4d. 17h. 6m.	27·91	704
"	" "	May, 1930	New York to Cherbourg *	3,200	4d. 20h. 48m.	27·40	654
Mauretania . .	Cunard Line	Sept., 1910	Liverpool to New York §	2,780	4d. 10h. 41m.	26·06	—
"	" "	Aug., 1924	New York to Cherbourg *	3,198	5d. 1h. 49m.	26·25	626
"	" "	Aug., 1929	Cherbourg to New York *	3,162	4d. 21h. 44m.	26·85	687
"	" "	Aug., 1929	New York to Plymouth †	3,098	4d. 17h. 50m.	27·22	636
"	" "	Aug., 1929	Plymouth to Cherbourg	106	—	29·7	—
Majestic . .	White Star Line	Sept., 1923	New York to Cherbourg *	3,104	5d. 5h. 21m.	24·76	613
Laurentic . .	" "	June, 1930	Quebec to Liverpool ‡	2,444	5d. 21h. 15m.	17·30	—
Empress of Britain	Canadian Pacific Steamships.	Aug., 1933	Quebec (Father Point) to Cherbourg	—	4d. 7h. 32m.	24·93	—
Empress of Japan	" "	Apr., 1931	Yokohama to Vancouver	—	7d. 20h. 16m.	—	—
China . . .	P. & O.	Sept. 26 to Oct. 14, 1919	London to Bombay	6,258	17d. 20h. ‖	15·7	—
Viceroy of India	" "	Sept 17 to Oct. 3, 1932	London to Bombay	—	16d. 1h. 42m. **	17·92	—
Rex	Italia Line.	Aug., 1933	Gibraltar to New York	3,181	4d. 13h. 58m.	28·92	736
Reina del Pacifico	Pacific Steam Navigation Co.	June 18 to Aug. 17, 1931	Liverpool, Valparaiso, Liverpool, *via* Panama Canal	18,366	59d. 13h. (actual steaming 43d. 3h.)	17·47	458

Remarks.

* Cherbourg Breakwater and Ambrose Channel Light Vessel.

† Ambrose Channel Light Vessel and Eddystone Lighthouse.

‡ Father Point and Bar Light Vessel.

§ Daunts Rock and Sandy Hook Lightship.

‖ Vessel did not deviate to Marseilles.

** Vessel called at Marseilles.

GENERAL PARTICULARS OF LARGE SHIPS OF VARIOUS NATIONALIITES.

Name of Ship	AQUITANIA.	MAURETANIA.	LEVIATHAN. (ex Vaterland).	BERENGARIA. (ex Imperator).	MAJESTIC. (ex Bismarck).	BREMEN.
Builders	J. Brown & Co., Ltd., Clydebank	Swan, Hunter & W. Richardson, Ltd., Wallsend-on-Tyne	Blohm & Voss, Hamburg	Vulcan Co., Hamburg	Blohm & Voss, Hamburg	Akt. Ges. Weser Bremen
Owners or Managers	Cunard Co.	Cunard Co.	United States Lines	Cunard Co.	White Star Line	Norddeutscher Lloyd
Year when built	1914	1907	1914	1912	1921	1929
Length over all	902 ft.	787 ft.	950 ft.	906 ft. 8½ in.	956 ft.	938 ft.
Length between perps. (or moulded)	865 ft.	760 ft.	907 ft.	883 ft. 6 in.	912 ft.	888 ft.
Breadth	97 ft.	88 ft.	100 ft. 3½ in.	98 ft. 3½ in.	100 ft.	101 ft. 8 in.
Depth (moulded)	64 ft. 6 in.	60 ft. 6 in.	63 ft.	63 ft.	64 ft.	45 ft. 6½ in. to D. Deck
Gross Tonnage	45,647	30,696	48,943	52,101	56,621	51,656
Draught	36 ft. 2 in.	36 ft. 2½ in.	38 ft. 6 in.	39 ft.	38 ft. 11¼ in.	32 ft.
Displacement (tons)	53,176	41,590	63,100	63,060	64,000	51,830
Number of Passengers—						
First Class	744	524	672 †	813	1000	800
Second Class	623	438	535	702	545	800§
Third Class	1226	796	2392 ‡	1327	2392	600
Machinery Makers	John Brown & Co., Ltd.	Wallsend Slipway and Engineering Co., Ltd.	Blohm & Voss, Hamburg	Vulcan Co., Hamburg	Blohm & Voss, Hamburg	Akt. Ges. Weser, Bremen
Type of Engines	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws	Stm. Turbs. driving 4 Screws
Revs. per Minute	180	180	180–190	180	180	182
Total Shaft H.P.	60,000	75,000	—	76,250	66,000	92,500
No. and Type of Boilers	21 Cylindrical (double ended)	25 Cylindrical (23 double-ended, 2 single-ended)	46 Water Tube	46 Water Tube	48 Water Tube	20 Water Tube (11 double-ended, 9 single-ended)
No. of Furnaces	168 (oil-fired)	192 (oil-fired)	138 (oil fired)	46 (oil-fired)	48 (oil-fired)	(oil-fired)
Steam Pressure (lb. per sq. in.)	195	195	235	228	260	330
Total Heating Surface (sq. ft.)	138,595	167,520	210,440	203,000	220,000	183,458
Total Grate Area (sq. ft.)	3541	4048	3843	3763	4018	—
System of Draught	Howden's	Howden's	Howden's	Howden's	Forced	Forced
Speed on Service (knots)	23	25·5 *	24	23	25	26

* This figure is the mean speed attained for 27 consecutive runs across the North Atlantic in one year, covering a total distance of 77,500 nautical miles.
† 80 Berths for Servants and 110 Pullman Berths in addition. ‡ Including 1542 Fourth Class Passengers. § Includes 300 Tourist Class.

DEVELOPMENT OF MARINE PROPELLING MACHINERY.

—	Approximate Date of Introduction in the United Kingdom.			
	Merchant.		Naval.	
Compound engines . .	—	1860	—	1865
Triple-expansion engines	—	1880	—	1885
Quadruple-expansion do.	—	1890	Not fitted . . .	—
Cylindrical boilers . .	—	1862	—	1869
Water-tube boilers . .	Cross-channel . .	1911	Destroyers . . .	1893
	Ocean liners . .	1914	Battleships . . .	1897
Direct turbines . . .	Cross-channel . .	1901	Destroyers . . .	1898
	Ocean liners . .	1905	Light cruisers . .	1904
			Battleships . . .	1906
Combination engines and turbines	Intermediate liner.	1908	(For cruising only)	1902
Combination machinery on common line shafting (Bauer-Wach). .	Intermediate liner and cargo steamers	1926	—	—
Geared turbines . . .	Single-reduction .	1911	Single-reduction .	1913
	Double-reduction .	1916	Not fitted . . .	—
High pressure turbines .	Single-reduction .	1926	Destroyers . . .	1926
Electric propulsion . .	First attempts . .	1904	Not fitted . . .	—
	Diesel-electric . .	1913	—	—
	Turbo-electric . . (Large liner)	1929	—	—
Oil fuel burning . . .	First attempts . .	1870	Coal and oil—	
			Destroyers . .	1902
			Battleships . .	1904
	Modern plant . .	1892	Oil alone—	
			Destroyers . .	1910
			Battleships . .	1913
Heavy oil engines . .	First attempts . .	1904	Tender	1914
	Modern plant . .	1910	Submarines . .	1908
	Double-acting . .	1924	Subm. depôt ship .	1928
	Supercharging . .	1925	—	—
Pulverised Coal Firing .	First attempts . .	1928	—	—

MARINE ENGINES UNDER CONSTRUCTION IN THE WORLD
(Recorded by Lloyd's Register of Shipping as at the end of September, 1933).

Country in which building.	Steam Engines.				Oil Engines.		Total.	
	Reciprocating.		Turbines.					
	No.	I.H.P.	No.	S.H.P.	No.	I.H.P.	No.	H.P.
Gt. Britain & Ireland	53	74,698	11	229,470	56	72,939	120	377,107
British Dominions .	2	1,650	1	4,000	—	—	3	5,650
Belgium	—	—	—	—	1	17,000	1	17,000
Denmark . . .	5	4,350	—	—	5	27,350	10	31,700
France	4	2,450	2	172,000	9	12,080	15	186,530
Germany	2	3,000	5	4,303	31	70,072	38	77,375
Holland	4	1,585	—	—	12	96,885	16	98,470
Italy	—	—	—	—	4	15,100	4	15,100
Japan	—	—	1	7,000	18	83,990	19	90,990
Norway	5	5,400	—	—	3	5,700	8	11,100
Spain	2	600	—	—	5	24,200	7	24,800
Sweden	1	750	—	—	60	55,470	61	56,220
United States . .	2	4,000	2	6,300	4	5,726	8	16,026
Other Countries .	1	400	—	—	10	7,680	11	8,080
Total . .	81	98,883	22	423,073	218	494,192	321	1,016,148

The horse-power is compiled from figures furnished by the engine makers.

PROGRESS IN MARINE MACHINERY.

Type of vessel.	Year.	Dimensions.		Performance.		Engines.						Boilers.					Total weight of Machinery, "Steam Up" (tons).	H.P. per ton of Machinery.	Coal Consumption (lbs. per H.P. hour).
		Length (feet).	Beam (feet).	Speed (knots).	Horse-power.	No. of Propellers.	Type of Machinery.*	No. of Cylinders (per shaft).	Propeller revs. per min.	Piston speed (f.p.m.)	Referred M.P. (lb. per sq. in.)	No. and Type.†	Working press. (lb. per sq. in.)	System of Draught.‡	Heating Surface per H.P. (sq. ft.)	H.P. per sq. ft. of grate.			
Atlantic liners	1881	500	50	18·0	10,680	1	C	3	64	770	29·1	—C	100	N	3·3	8·57	1,860	5·74	—
	1888	528	63	20·1	18,500	2	TE	3	86	860	35·3	9 DC	150	CS	2·75	14·3	2,516	7·4	1·7
	1893	600	65	22·0	30,000	2	TE	5	81	930	35	12 DC	165	N	2·73	11·4	4,935	6·1	1·6
	1899	685	68	20·7	27,000	2	TE	4	78	936	35	15 DC	192	AD	2·77	13·75	4,414	6·1	—
	1907	760	87	26·0	72,500	4	T	—	180	—	—	23 DC & 2 C	195	H	2·19	17·9	9,936	7·3	1·4
	1914	865	96	23·5	60,000	4	T	—	180	—	—	21 DC	195	H	2·31	16·9	9,302	6·5	1·3
	1921	912	100	23·5	66,000	4	T	—	180	—	—	48 W	260	FD	3·33	16·4	—	—	—
Intermediate Ocean liners	1880	400	45	12·5	3,000*	1	C	2	61	671	20·5	2 C	90	N	3·1	7·6	685	4·35	2·4
	1892	470	53	12·5	3,500*	2	TE	3	80	640	32·0	2 DC & 1 C	170	N	3·3	10·0	795	4·4	1·9
	1911	520	64	14·5	7,500*	2	QE	4	82	738	37·0	5 DC	210	N	3·25	11·75	1,750	4·25	1·6
	1914	550	66	16·5	11,000§	2	GT	—	133	1,650P	—	5 DC	210	H	2·5	17·5	1,800	6·1	1·4
	1920	550	66	17·0	11,000§	2	GT	—	85	{3,200 / 2,000}Q	—	5 Wz	250	OD	2·25	—	1,210	9·1	0·9a
Cargo steamers	1877	314	35	11·25	775*	1	FC	—	52	450	23	1 OC	70	N	4·46	7·6	200	3·87	2·5
	1885	320	38	12·25	1,650*	1	TE	—	70	560	31·5	2 C	150	N	2·82	10·4	340	4·85	1·95
	1911	440	52	13·25	4,200*	1	TE	—	73	750	35	2 C	190	FD	2·8	16·25	900	4·67	1·65
	1914	450	56	14·25	5,000§	1	GT	—	102	1,350P	—	2 C	195	H	2·30	20·0	930	6·45	1·45
	1920	503	63	14·25	7,000§	2	DT	—	80	{3,500 / 1,800}Q	—	3 FCz	200	OD	2·25	—	1,100	6·35	0·85a
Cross-Channel Steamers	1890	300	35	18·00	4,400*	2	TE	3	130	780	30·75	5 C	160	N	2·6	12·25	590	7·45	2·25
	1898	315	37	19·75	5,520*	2	TE	4	165	910	43·0	4 C	180	FD	1·95	17·5	610	9·62	2·1
	1904	330	42	19·5	5,500§	3	T	—	550	550P	—	2DC&1C	150	FD	1·9	16·5	590	9·3	1·8
	1910	316	41	21·5	8,500§	3	T	—	625	625P	—	7 W	190	FD	1·95	15·0	735	11·6	1·7
	1920	302	36	23·5	12,300§	2	GT	—	435	{2,600 / 1,800}Q	—	8 W	195	FD	2·00	22·0	1,055	11·65	1·5
	1925	329	45	22·25	—	2	GT	—	270	—	—	5 W	200	FD	—	—	—	—	—
Motor ships	1909	210	38	8·5	490*	1	4 S	6	140	550	99y	Steam auxiliaries		—	—	—	91	4·3t	0·6a
	1910	260	43	10·5	1,460*	1	4 S	6	125	820	111y	,,	,,	—	—	—	220	5·0t	0·5a
	1912	380	53	11·0	2,500*	2	4 S	8	140	670	89·8y	Electric	,,	—	—	—	390	4·8t	0·47a
	1914	425	55	11·25	3,100*	2	4 S	6	125	785	89·5y	,,	,,	—	—	—	475	4·9t	0·45a
	1916	450	57	12·0	4,000*	2	4 S	6	100	725	91·0y	,,	,,	—	—	—	600	5·0t	0·45a
	1922	502	62	18·5	6,400*	2	4 S	8	115	865	91·5y	,,	,,	—	—	—	940	5·1t	0·45a
	1924	580	72	18·5	17,500*	4	2 S	6	135	880	93·0y	Steam	,,	—	—	—	2,350	—	0·48a
	1926	630	79	17·0	20,000	2	4 D	8	125	1,229	83·0y	Electric	,,	—	—	—	5,000	5·0	0·43a
	1927	711	82	20·0	25,000	4	2 D	6	120	950	—	,,	,,	—	—	—	—	—	—

* C = Vertical Compound; F.C. = Tandem Compound with flywheel; TE = triple expansion; QE = quadruple expansion; T = turbines; GT = geared turbines; DT = double-reduction geared turbines; ED = electric drive; 4S = 4-cycle single acting motors; 4D = 4-cycle double-acting motors; 2S = 2-cycle single acting motors.

† C = cylindrical; OC = oval ends and cylindrical middle portion; DC = double-ended cylindrical; FC = oil-fired cylindrical; W = water-tube (oil-fired).

‡ N = natural draught; AD = assisted draught; CS = closed stokehold; FD = forced draught; H = Howden's forced draught; OD = oil-burning with forced draught.

* I.H.P. § S.H.P. t B.H.P. P turbine revs. per min. Q turbine revs. per min., H.P. and L.P. respectively.

z with superheaters. a Oil. y Mean Pressures for motorships are on I.H.P. basis.

NUMBERS OF MERCHANT VESSELS USING THE VARIOUS TYPES OF PROPULSION.*

(Excluding vessels of less than 100 tons gross.) As at June, 1933.

Country.	Oil Engines.	Steam Turbines.	Steam Reciprocating Engines.	Auxiliary Steam Engines.	Auxiliary Oil Engines.	Sails.	Totals.
Great Britain and Ireland	520	330	6,404	—	74	377	7,705
British Dominions	241	26	1,817	4	97	343	2,528
British Empire	761	356	8,221	4	171	720	10.233
United States	288	540	1,802	—	20	526	3,176
Belgium	34	7	168	—	2	1	212
Denmark	122	15	472	2	94	21	726
France	97	74	1,302	1	37	116	1,627
Germany	217	59	1,491	5	299	13	2,084
Greece	3	2	522	—	10	—	537
Holland	413	59	819	—	101	21	1,413
Italy	136	52	784	3	77	226	1,278
Japan	279	46	1,466	58	170	—	2,019
Norway	367	11	1,519	16	52	5	1,970
Spain	73	11	657	7	52	65	865
Sweden	151	12	1,012	—	164	56	1,395
Other Countries	323	18	2,738	4	143	385	3,611
Total	3,264§	1,262‡	22,973†	100	1,392	2,155	31,146

* Excluding American Great Lakes vessels and Japanese sailing vessels.
† Includes 234 ships fitted with a combination of reciprocating and turbine engines.
‡ Includes 48 ships fitted with turbo-electric drive.
§ Includes 48 ships fitted with Diesel-electric drive.

COMPARISON OF RUNNING COSTS OF STEAM- AND MOTORSHIPS.

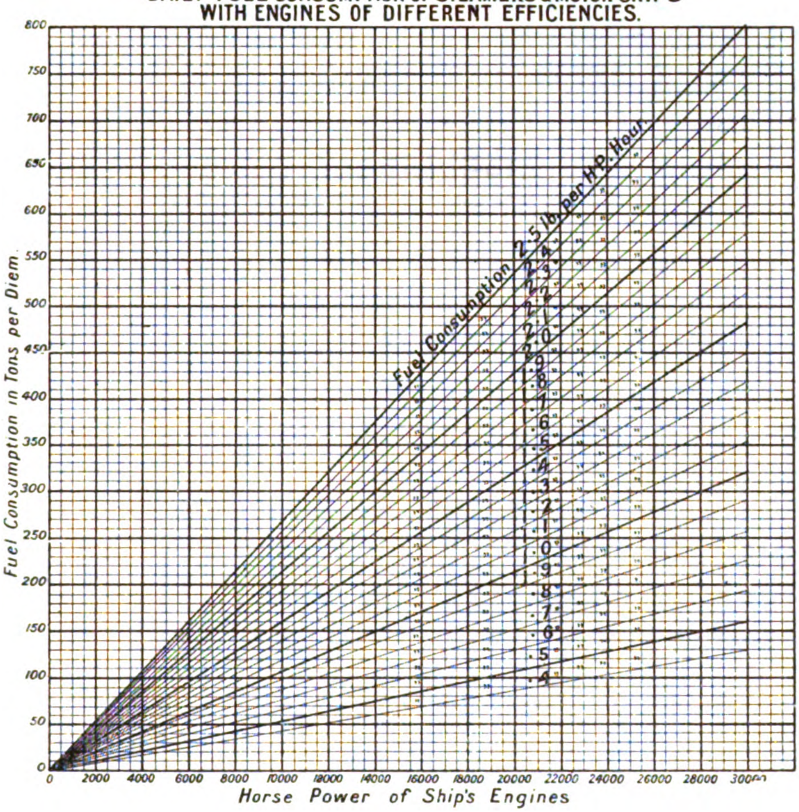
DEADWEIGHT CAPACITY, 8,000 TONS. SPEED, 10½ KNOTS. VOYAGE, 30 DAYS.

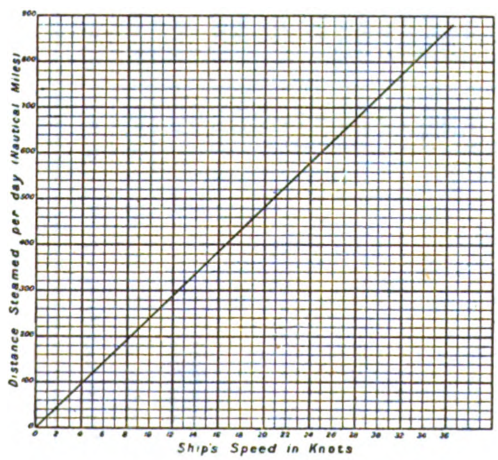
Type of Machinery	S.S. Diesel 2,200 B.H.P.	S.S. Geared Turbines. 2,200 S.H.P.	S.S. Recip. 2,500 I.H.P.	S.S. Recip. Bauer Wach 2,500 I.H.P.
Fuel	Oil.	Coal.	Coal.	Coal.
Fuel 163/h.p. hour	0·4	1·56	1·65	1·25
,, tons day	9·4	36·7	44·2	33⅓
,, voyage	282	1,101	1,326	1,005
Price, fuel/ton	£8 5*s.*	£1 5*s.*	£1 5*s.*	£1 5*s.*
Cost/voyage	£916 10*s.*	£1,376 5*s.*	£1,657 10*s.*	£1,256 5*s.*
Lub. oil, galls./day	14	6	4	6
,, cost/gall.	2*s.* 2*d.*	2*s.* 2*d.*	1*s.* 9*d.*	2*s.* 2*d.*
,, voyage	£45	£19 10*s.*	£10 10*s.*	£19 10*s.*
E.R. staff	8	21	21	21
Wages/voyage	£151	£228 10*s.*	£228 10*s.*	£228 10*s.*
Provision/voyage	£30	£78 15*s.*	£78 15*s.*	£78 15*s.*
Wages, fuel, lub. oil, and provisions/voyage	£1,132 10*s.*	£1,703	£1,975 5*s.*	£1,583
Running costs—Ratio	1	1·5	1·74	1·4
Comparative cost—Fuel winches/harbour	£28 10*s.* (electric)	£96 5*s.* (steam)	£96 5*s.* (steam)	£96 5*s.* (steam)

NOTABLE MOTORSHIPS.

Date.	Name.	Gross tonnage.	Dimensions. (ft.)	Owners.	Builders.	Machinery makers.	Type of engine.	Cycle.	No. of eng.	Total B.H.P.	Revs. per min.
1912	Juno	2,345	257·6 × 43·1 × 18·6	Nederl. Indische Tankstoomboot Maats.	Nederl. Schs. Maats.	Werkspoor	Werkspoor	4 single act.	1	1,100	125
1918	Aba	7,937	450·5 × 55·8 × 36·6	Elder Dempster	Barclay, Curle and Co.	Harland & Wolff	B. & W.	4 single act.	2	5,250	115
1922	Pacific Commerce	5,089	420·0 × 54·0 × 25·0	Furness Withy	Wm. Doxford and Sons	Doxford	Doxford	2 opposed pistons	1	2,700	77
1923	Brazza	10,193	453·1 × 59·1 × 36·1	Chargeurs Réunis	Atel. & Ch. de la Loire	Sulzer	Sulzer	2 single act.	2	3,400	85
1924	Dolius	5,994	407·0 × 52·2 × 28·4	A. Holt & Co.	Scott's S.B. & E. Co.	Scott's S.B. & E. Co.	Still	2 double act.	2	2,500	120
1924	Aorangi	17,491	580·1 × 72·2 × 43·4	Canadian Australasian Line	Fairfield S.B. & E. Co.	Fairfield S.B. & E. Co.	Sulzer	2 single act.	4	13,000	135
1925	Gripsholm	17,544	553·0 × 74·4 × 37·7	Swedish-America Line	Armstrong Whitworth & Co.	Burmeister & Wain	B. & W.	4 double act.	2	13,500	125
1925	Asturias	22,071	630·5 × 78·5 × 40·5	Royal Mail	Harland & Wolff	Harland & Wolff	B. & W.	4 double act.	2	16,500	125
1926	Carnarvon Castle	20,063	630·7 × 73·5 × 41·5	Union Castle	Harland & Wolff	Harland & Wolff	B. & W.	4 double act.	2	13,000	105
1927	Saturnia	23,940	631·4 × 79·8 × 29·5	Cosulich Line	C.N. Triestino	Stab. Tec. Triestino	B. & W.	4 dbl. act. with super chargers	2	20,000	125
1927	Augustus	30,418	710·9 × 82·8 × 46·5	Italia Line	Soc. Anon. Ansaldo	M.A.N. & Cant. Off. Savoia	M.A.N.	2 double act.	4	25,000	120
1928	Kungsholm	20,223	594·9 × 78·2 × 37·8	Swedish-America Line	Blohm & Voss	Burmeister & Wain	B. & W.	4 double act.	2	15,000	100
1930	Britannic	26,943	683·6 × 82·4 × 48·6	White Star Line	Harland & Wolff	Harland & Wolff	B. & W.	4 double act.	2	20,000	110

DAILY FUEL CONSUMPTION OF STEAMERS & MOTOR SHIPS
WITH ENGINES OF DIFFERENT EFFICIENCIES.





DISTANCE STEAMED IN ONE DAY
BY SHIPS OF DIFFERENT SPEEDS.

NATIONALITY AND NET TONNAGE OF VESSELS, ENTERED AND CLEARED WITH CARGOES, IN THE FOREIGN TRADE OF THE UNITED KINGDOM FOR 1913, 1931, AND 1932.

(Thousands of Net Tons.)

Nationality.	Entrances.			Clearances.			Percentage Entrances.			Percentage Clearances.		
	1913.	1931.	1932.	1913.	1931.	1932.	1913.	1931.	1932.	1913.	1931.	1932.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.						
British	32,292	38,212	35,511	40,101	38,164	34,850	65·8	63·4	63·3	59·1	65·4	65·3
Foreign :—												
Norwegian	3,285	2,696	3,009	4,683	1,619	1,899	6·7	4·5	5·4	6·9	2·8	3·5
American	724	2,386	1,817	370	1,350	736	1·5	4·0	3·2	0·5	2·3	1·4
Swedish	1,891	1,674	1,900	3,016	1,336	1,477	3·9	2·8	3·3	4·5	2·3	2·8
Dutch	1,702	3,224	2,913	2,536	3,026	2,497	3·5	5·3	5·2	3·7	5·2	4·7
Danish	1,161	1,999	1,927	2,613	1,719	1,950	2·4	3·3	3·4	3·9	2·9	3·6
French	999	2,266	1,881	1,975	3,087	2,605	2·0	3·8	3·4	2·9	5·3	4·9
Belgian	1,369	1,419	1,121	957	1,143	1,067	2·8	2·3	2·0	1·4	2·0	2·0
Japanese	140	504	669	282	487	584	0·3	0·8	1·2	0·4	0·8	1·1
Spanish	1,060	570	592	1,694	1,231	1,008	2·2	0·9	1·1	2·5	2·1	1·9
Italian	122	512	472	955	887	857	0·2	0·9	0·9	1·4	1·5	1·6
Russian*	678	—	—	937	—	—	1·4	—	—	1·4	—	—
Greek	221	530	334	1,072	850	730	0·4	0·9	0·6	1·6	1·5	1·4
German	3,166	2,532	1,685	5,730	1,842	1,300	6·4	4·2	3·0	8·5	3·2	2·4
Austro-Hungarian*	128	—	—	715	—	—	0·3	—	—	1·0	—	—
Other Nationalities	125	1,776	2,229	185	1,599	1,830	0·2	2·9	4·0	0·3	2·7	3·4
Total Foreign	16,772	22,088	20,549	27,720	20,176	18,540	34·2	36·6	36·7	40·9	34·6	34·7
Total British and Foreign	49,064	60,300	56,060	67,821	58,340	53,390	100·0	100·0	100·0	100·0	100·0	100·0

* Included in "Other Nationalities."

	Entrances and Clearances.			Percentages.		
	1913.	1931.	1932.	1913.	1931.	1932.
	Tons.	Tons.	Tons.			
British	72,393	76,376	70,361	62	64·4	64·3
Foreign	44,492	42,264	39,089	38	35·6	35·7
Total	116,885	118,640	109,450	100	100·0	100·0

ENTRANCES AND CLEARANCES IN THE FOREIGN TRADE OF THE UNDERMENTIONED COUNTRIES FOR THE YEARS 1913, 1931, AND 1932.

Note.—C=With Cargo only. C & B=With Cargo and in Ballast.

Countries.		Entrances.			Clearances.		
		1913.	1931.	1932.	1913.	1931.	1932.
		Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.
United Kingdom	C	49,068	60,300	56,064	67,824	58,344	53,388
United States of America	C	33,924	53,244	47,568	44,484	58,452	50,712
France	C	34,512	57,672	52,644	26,112	48,264	44,496
Japan	C & B	24,720	54,768	53,964	24,900	54,672	53,988
Netherlands	C	17,148	21,924	18,732	11,016	16,344	13,392
Spain	C	11,605	17,100	16,368	23,484	23,628	23,184
British India	C	6,700	7,308	7,044	8,256	7,476	7,380
Australia	C & B	5,364	5,580	5,760	5,232	5,664	5,664
South Africa	C & B	5,352	4,968	4,764	5,280	4,956	4,764
Norway	C	3,756	4,104	4,212	4,740	3,396	3,744
Belgium	C & B	16,908	27,792	24,312	16,896	27,660	24,252
Sweden	C	13,764	13,848	12,876	17,004	12,720	11,460
Germany	C	26,580	31,152	26,820	26,640	27,876	23,952

ABOVE AS PERCENTAGES OF 1913 FIGURES.

United Kingdom	100	123	114	100	86	146
United States of America	100	157	140	100	131	114
France	100	167	153	100	185	170
Japan	100	222	218	100	220	217
Netherlands	100	128	109	100	148	122
Spain	100	147	141	100	101	98
British India	100	109	105	100	91	89
Australia	100	104	107	100	108	108
South Africa	100	93	89	100	94	90
Norway	100	109	112	100	72	79
Belgium	100	164	144	100	164	144
Sweden	100	101	94	100	75	67
Germany	100	117	101	100	105	90

NUMBER AND NET TONNAGE OF VESSELS THAT PASSED THROUGH THE SUEZ CANAL IN THE YEARS 1913, 1930, 1931, AND 1932, DISTINGUISHING THE PRINCIPAL NATIONALITIES.

Nationality of Vessels.	Number of Passages.				Net Tonnage of Vessels.				Numbers as Percentages of Total.				Tonnages as Percentages of Total.			
	1913.	1930.	1931.	1932.	1913.	1930.	1931.	1932.	1913.	1930.	1931.	1932.	1913.	1930.	1931.	1932.
British	2951	3125	2976	2787	12,052,484	17,600,483	16,624,352	15,721,294	58·0	54·2	55·5	55·4	60·2	55 6	55·4	55·5
Japanese . . .	68	156	196	262	343,732	938,700	1,153,133	1,439,626	1·3	2·7	3·6	5·2	1·7	3·0	3·8	5·1
Dutch	342	591	444	342	1,287,354	3,312,531	2,848,368	2,364,185	6·7	10·3	8·3	6·8	6·4	10·5	9·5	8·3
French . . .	256	357	354	332	927,787	2,001,837	2,084,035	2,037,026	5·0	6·2	6·6	6·6	4·6	6·3	6·9	7·2
Italian	110	307	286	316	290,576	1,502,559	1,424,095	1,609,119	2·2	5·3	5·3	6·3	1·5	4·7	4·7	5·7
Danish	56	83	70	79	171,848	431,965	366,532	497,938	1·1	1·4	1·3	1·6	0·9	1·4	1·2	1·5
Norwegian . .	44	193	151	179	93,313	965,827	745,740	860,956	0·9	3·4	2·8	3·6	0·5	3·1	2·5	3·0
American (U.S) .	8	106	103	82	7,476	670,391	624,535	525,712	0·2	1·8	1·9	1·6	—	2·1	2·1	1·9
Swedish . . .	33	73	79	91	122,957	354,266	383,254	411,398	0·7	1·3	1·5	1·8	0·6	1·1	1·3	1·4
Greek	17	54	25	32	54,560	95,363	52,609	77,753	0·3	0·9	0·5	0·6	0·3	0·3	0·2	0·3
Spanish . .	26	3	—	—	75,643	9,032	—	—	0·5	0·1	—	—	0·4	0·0	—	—
German . . .	778	600	568	431	3,352,287	3,388,842	3,314,750	2,505,826	15·3	10·4	10·6	8·6	16·7	10·7	11·0	8·8
Austria-Hungarian	246	—	—	—	845,830	—	—	—	4·8	—	—	—	4·2	—	—	—
Russian. . . .	110	46	62	78	340,595	129,554	175,494	274,235	2·2	0·8	1·1	1·5	1·7	0·4	0·6	1·0
All others . . .	40	67	52	21	67,422	267,409	231,069	75,222	0·8	1·2	1·0	0·4	0·3	0·8	0·8	0·3
Total . .	5085	5751	5366	5032	20,033,802	31,668,759	30,027,966	28,340,290	100·0	100·0	100·0	100·0	100·0	100·0	100 0	100·0

NOTE.—The above figures include not only Merchant Vessels and Mail Steamers, but also Warships and Transports as well as Government Chartered Vessels.

NUMBER AND NET TONNAGE OF COMMERCIAL VESSELS THAT PASSED THROUGH THE PANAMA CANAL IN THE YEARS ENDED 30TH JUNE, 1920, 1922, 1924, 1926, 1928, 1930, 1932, AND 1933, DISTINGUISHING THE PRINCIPAL NATIONALITIES.

NOTE.—Commercial Vessels include all Vessels except those of the United States Government, or chartered by the U.S. Government to carry Government supplies, and Vessels of less than 10 tons measurement.

Nationality.	Number of Vessels.								Net Tonnage of Vessels.							
	1920.	1922.	1924.	1926.	1928.	1930.	1932.	1933.	1920.	1922.	1924.	1926.	1928.	1930.	1932.	1933.
British	753	935	1,265	1,423	1,842	1,536	1,054	1,039	2,760,188	3,795,526	6,097,611	7,039,542	8,976,960	8,006,962	5,905,907	5,660,301
American (U.S.A.)*	1,129	1,095	2,947	2,432	2,753	2.885	1,917	1,686	3,791,088	4,971,509	15,806,899	12,565,255	13,752,957	14,534,495	10,790,751	10,099,102
German	—	—	—	—	—	377†	338†	325†	—	—	—	—	—	1,433,074†	1,290,990†	1,010,756†
Norwegian . . .	106	113	136	306	313	371	311	407	397,632	385,007	546,633	987,040	1,181,189	1,660,101	1,530,459	2,013,881
Japanese	118	189	171	181	188	163	179	217	515,243	872,466	815,468	946,028	909,232	803,182	980,349	1,179,514
Chilean	79	53	47	26	32	46	5	7	212,000	150,398	176,472	121,901	124,959	164,152	8,856	26,708
Danish	9	53	65	63	69	91	105	113	32,221	227,473	245,929	234,753	285,396	381,766	561,492	580,515
Peruvian	75	60	70	64	53	2	3	4	191,689	161,930	189,046	149,162	140,323	8,959	3.367	336
Dutch	29	66	102	93	137	141	117	80	152,535	293,428	551,761	530,652	644,390	671,250	553,085	500,474
French	60	51	83	90	127	124	81	66	114,664	190,171	386,640	421,752	580,769	627,760	454,890	231,870
Spanish	41	9	45	31	46	2	2	—	106,651	27,264	172,572	121,461	157,465	4,209	8,470	—
Other Nationalities	79	112	299	538	896	447	394	550	272,133	342,287	1,159,847	1,657,045	2,704,894	1,684,704	1,546,704	1,418,419
Totals . . .	2,478	2,736	5,230	5,197	6,456	6,185	4,506	4,494	8,546,044	11,417,459	26,148,878	24,774,591	29,458,634	29,980,614	23,625,419	22,821,876

ABOVE AS PERCENTAGES.

	1920.	1922.	1924.	1926.	1928.	1930.	1932.	1933.	1920.	1922.	1924.	1926.	1928.	1930.	1932.	1933.
British	30·4	34·2	24·2	27·4	28·6	24·8	23·4	23·1	32·3	33·3	23·3	28·4	30·4	26·7	25·0	24·8
American (U.S.A.)*	45·6	40·0	56·3	46·8	42·6	46·7	42·5	37·5	44·4	43·5	60·5	50·7	46·7	48·5	45·7	44·2
German † . . .	—	—	—	—	—	6·1	7·5	7 2	—	—	—	—	—	4·8	5.4	4·4
Norwegian . . .	4·3	4·1	2·6	5·9	4·8	6·0	6·9	9·1	4·7	3·4	2·1	4·0	4·0	5·5	6·5	8·8
Japanese . . .	4·8	6·9	3·3	2·5	2·9	2·6	4·0	4·8	6·0	7·6	3·1	3·8	3·1	2·7	4·2	5·2
Chilean	3·2	2·0	0·8	5·0	0·5	0·8	0·1	0·2	2·5	1·3	0·7	0·5	0·5	0·6	0·0	0·2
Danish	0·3	2·0	1·2	1·2	1·1	1·5	2·4	2·5	0·4	2·0	0·9	1·0	1·0	1·3	2·4	2·3
Peruvian	3·0	2·2	1·3	1·2	0·8	0·0	0·1	0·1	2·2	1·4	0·7	0·6	0·5	0·0	0·0	0 0
Dutch	1·2	2·4	2·0	1·8	2·1	2 3	2·6	1·8	1·8	2·6	2·1	2·1	2·2	2·2	2·3	2·2
French	2·4	1·8	1·6	1·7	2·0	2·0	1·8	1·5	1·3	1·7	1·5	1·7	2·0	2·1	1·9	1·7
Spanish	1·6	0·3	0·9	6·0	0·7	0·0	0·0	—	1·2	0·2	0·7	0·5	0·5	0·0	0·0	—
Other Nationalities	3·2	4·1	5·8	0·5	13·9	7·2	8·7	12·2	3·2	3·0	4·4	6·7	9·1	5·6	6 6	6·2
Totals . . .	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100 0	100·0

* Includes Vessels engaged in the coasting trade of the U.S.A., which is carried on *entirely* by National Ships.
† Included with "Other Nationalities" in previous years.

Cargoes (in tons weight) carried in Commercial Vessels that passed through the Panama Canal during the Years ended 30th June, 1920, 1922, 1924, 1926, 1928, 1930, 1932, and 1933, distinguishing the Principal Nationalities.

Nationality of Vessels.	Weight of Cargoes carried.							
	1920.	1922.	1924.	1926.	1928.	1930.	1932.	1933.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
British . .	2,830,268	3,329,861	6,051,842	6,750,843	8,075,022	7,572,969	4,638,068	4,170,995
American (U.S.A.)	4,547,140	4,950,519	16,654,435	13,710,956	14,258,735	14,499,233	8,835,055	7,987,739
German .	—	—	—	—	—	1,388,022*	1,078,738*	813,231*
Norwegian .	404,323	408,268	539,101	1,051,276	1,268,124	1,808,278	1,427,284	1,773,161
Japanese .	726,338	1,044,515	935,245	667,982	1,041,166	1,009,735	1,031,704	1,159,733
Chilean . .	104,738	46,182	107,147	82,695	81,678	105,511	6,420	28,218
Danish . .	42,533	272,779	317,274	295,530	380,240	505,914	521,481	448,863
Peruvian .	119,418	64,370	102,136	94,778	96,175	18,107	4,615	669
Dutch . .	128,442	290,573	573,929	552,741	637,178	618,718	440,870	381,071
French . .	125,249	139,463	407,249	398,393	600,421	576,753	338,786	249,395
Spanish . .	101,563	23,701	67,903	49,956	104,606	8,250	7,650	—
Other Nationalities .	244,487	314,679	1,238,449	2,382,298	3,097,364	1,923,742	1,477,327	1,164,653
Totals .	9,374,499	10,884,910	26,994,710	26,037,448	29,630,709	30,030,232	19,807,998	18,177,728

Above as Percentages.

	1920	1922.	1924.	1926.	1928.	1930.	1932.	1933.
British . .	30·2	30·6	22·4	25·9	27·2	25·2	23·4	22·9
American (U.S.A.)	48·5	45·5	61·7	52·7	48·2	48·3	44·6	43·9
German .	—	—	—	—	—	4·6*	5·4	4·5*
Norwegian .	4·3	3·7	2·0	4·0	4·3	6·0	7·2	9·8
Japanese .	7·7	9·6	3·5	2·6	3·5	3·4	5·2	6·4
Chilean . .	1·1	0·4	0·4	0·3	0·3	0·4	0·0	0·1
Danish . .	0·5	2·5	1·2	1·1	1·3	1·7	2·6	2·5
Peruvian .	1·3	0·6	0·4	0·4	0·3	0·0	0·0	0·0
Dutch . .	1·4	2·7	2·1	2·1	2·2	2·1	2·2	2·1
French . .	1·3	1·3	1·5	1·5	2·0	1·9	1·7	1·4
Spanish . .	1·1	0·2	0·3	0·2	0·3	0·0	0·0	—
Other Nationalities .	2·6	2·9	4·5	9·2	10·4	6·4	7.7	6·4
Totals .	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

* Included with "Other Nationalities" in previous years.

FREIGHT RATES.

Estimated Average Rates of Freight for Steamers in the Open Market, for various Years.

Outward.
From Tyne and N.E. Coast ports.

To	1920. s. d.	1921. s. d.	1924. s. d.	1928. s. d.	1931. s. d.	1932. s. d.
River Plate . .	—	19 10	13 0	12 3	9 7¾	9 1
Port Said . .	41 3	15 4	10 11¼	10 4½	6 8¼	6 7
Alexandria . .	—	16 11	11 5	10 4	7 3½	6 11½
Barcelona . .	34 0	16 8	12 5½	11 11¾	8 4	9 4¾
Oporto . . .	46 6	16 6	13 0	8 7	8 9½	8 9¾
Canary Islands .	—	12 10	9 1½	8 7	7 0	6 11½
Bordeaux . .	38 10	8 11	5 10	5 5¾	4 8	4 4¾
Bilbao . . .	—	12 10	7 11½	8 0¼	6 10½	6 9¼
Stockholm . .	—	10 7	5 11¼	—	5 5½	4 6¼
Rotterdam . .	17 3½	8 7	4 3¾	3 11¼	3 5¼	3 5
Hamburg . .	10 3	6 10½	4 5½	—	3 8¾	3 7¼
Algiers . . .	51 5	13 2	9 4½	8 5	7 5¼	7 3¼

Homeward.
To U.K. or Continent, except where otherwise stated.

From	1920. s. d.	1921. s. d.	1924. s. d.	1928. s. d.	1931. s. d.	1932. s. d.
River Plate (Lower Ports)	118 6	35 8	23 9¼	20 1¼	16 10¼	16 5½
River Plate (San Lorenzo) .	125 0	45 1	25 9¾	22 2	17 10	16 11½
Gulf (per quarter)	12 4	6 10¼	4 5¼	4 2¾	2 5¼	2 2¼
Calcutta . .	106 10	25 0	30 1	—	—	—
Karachi. . .	84 6	28 4	23 8½	22 6¼	—	—
Rice Ports . .	112 0	34 2	32 8¾	26 4	23 5	25 7
Bombay (d.w.).	86 0	24 10	26 1¾	19 3½	20 3	20 9
Odessa, etc. (direct) . .	—	—	14 10	11 7¾	10 8½	10 2½
Danube . .	60 2	25 10	19 10¾	14 7	14 8½	14 2½
Sulina (direct) .	56 0	—	15 10½	11 2½	11 1½	10 11¼
Bilbao* . .	25 1¾	10 2	6 8	6 0½	4 3	—
Huelva . . .	28 1	10 8	8 5½	8 8	7 9¼	7 5¼

* To Tyne.

"LAID-UP" STEAM AND MOTOR TONNAGE OF PRINCIPAL MARITIME COUNTRIES

	Jan. 1st, 1928.	Jan. 1st, 1929.	Jan. 1st, 1930.	Jan. 1st, 1931.	Jan. 1st, 1932.	July 1st, 1932.	Jan. 1st, 1933.	July 1st, 1933.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Gt. Brit. & Ireland	575,000	528,000	564,000	2,549,000	3,146,000	3,514,000	3,095,000	3,204,000
Australia . . .	†	†	†	†	165,000	112,000	106,000	87,000
United States :—								
Shipping Board .	2,405,000	2,144,000	1,588,000	1,443,000	1,341,000	1,522,000	1,519,000	1,451,000
Privately owned .	726,000	818,000	666,000	1,216,000	1,843,000	1,903,000	2,069,000	1,792,000
U.S. total .	3,131,000	2,962,000	2,254,000	2,659,000	3,184,000	3,425,000	3,588,000	3,243,000
Belgium . . .	†	†	†	†	187,000	231,000	177,000	139,000
Denmark . . .	†	†	†	†	210,000	231,000	275,000	105,000
France	177,000	133,000	90,000	219,000	751,000	983,000	1,006,000	975,000
Greece	77,000	74,000	87,000	223,000	180,000	498,000	207,000	309,000
Holland . . .	16,000	9,000	4,000	324,000	595,000	755,000	782,000	560,000
Italy	312,000	250,000	170,000	649,000	800,000	863,000	638,000	526,000
Japan	49,000	46,000	44,000	323,000	359,000	226,000	256,000	159,000
Norway	136,000	19,000	13,000	572,000	942,000	801,000	635,000	634,000
Spain	52,000	31,000	25,000	102,000	139,000	254,000	250,000	392,000
Sweden . . .	28,000	2,000	2,000	106,000	186,000	152,000	211,000	138,000
Other Countries .	†	†	†	†	1,034,000	1,138,000	1.308,000	763,000
World's total .	4,553,000	4,054,000	3,253,000	7,857,000	11,878,000	13,183,000	12,534,000	11,234,000

† No data available.

PAY IN THE MERCHANT SERVICE.—Monthly Rates.

*Foreign-going Cargo Steamers.**

Rating.	1914.	1924.†	1932.‡
	£ s. £ s.	£ s. £ s.	£ s. £ s.
First Mates . . .	12 5 to 14 5	17 10 to 26 10	14 8 to 22 10
Second Mates . .	9 5 ,, 12 15	15 0 ,, 18 10	12 3 ,, 15 6
Third Mates . .	7 10 ,, 10 10	13 0 ,, 14 0	10 7 ,, 11 5
Chief Engineers .	16 15 ,, 24 0	21 10 ,, 34 10	18 0 ,, 29 14
Second Engineers .	12 5 ,, 14 15	17 10 ,, 26 10	14 8 ,, 22 10
Third Engineers .	8 15 ,, 11 15	15 0 ,, 18 10	12 3 ,, 15 6 10 7 ,, 11 5
Carpenters . . .	7 0 ,, 7 10	12 10 ,, 16 10	10 12 ,, 11 5
Boatswains . . .	6 5 ,, 6 10	11 10 (Fixed rate.)	9 12 (Fixed rate.)
Firemen	5 10 ,, 6 0	10 10 ,,	8 12 ,,
Able Seamen . .	5 0 ,, 5 10	10 0 ,,	8 2 ,,

* On Oil-Tank Vessels the rates are supplemented by the following percentage additions :—

Chief Engineers . . . . 12½ per cent.
First Mates and Second Engineers . . . . . 10 ,,
Other Mates and Engineers . . . . 7½ ,,

On Motor Vessels there is a special National Standard Scale of Pay for Engineer Officers substantially higher than on steam-driven vessels.

† The 1924 figures are the National Maritime Board standard rates of pay, effective from September 5, 1924, and based, in the case of Navigating and Engineer Officers, on tonnage and seniority.

‡ These rates, effective from January 31, 1932, represent in general a reduction of 10 per cent on those ruling in 1925–31.

On Passenger Liners, Navigating and Engineer Officers, as a rule, receive now, as before the War, wages from 10 to 20 per cent. higher than the Standard Cargo-Vessel rates.

EXPORTS OF NEW SHIPS FROM THE UNITED KINGDOM.

Ships not Registered as British, with their Machinery.

Year.	War Vessels (including Machinery and Armament).	Steam and Motor Ships (other than War Vessels).		Sailing Ships (other than War Vessels) including Boats.	Total of New Ships.
		Hulls and Fittings.	Machinery.		
	£	£	£	£	£
1904	388,600	2,570,835	1,164,779	330,937	4,455,151
1905	50,000	3,693,422	1,516,183	171,693	5,431,298
1906	2,800,000	3,973,873	1,668,592	201,706	8,644,171
1907	554,700	6,586,449	2,550,702	326,262	10,018,113
1908	1,879,994	5,902,428	2,505,280	189,773	10,567,475
1909	247,000	3,698,556	1,819,618	161,940	5,927,114
1910	4,894,500	2,553,427	1,209,119	113,158	8,770,204
1911	25,000	3,745,349	1,632,402	259,564	5,663,115
1912	765,000	4,243,308	1,750,351	268,503	7,027,162
1913	2,617,100	5,867,179	2,336,509	205,742	11,026,530
1914	308,385	4,716,226	1,784,900	123,043	6,932,554
1915	—	1,170,606	472,597	49,548	1,692,661
1916	20,000	754,372	481,703	34,510	1,290,585
1917	—	706,084	347,354	33,869	1,087,307
1918	—	778,525	229,292	39,517	1,047,334
1919	—	1,703,961	505,652	118,718	2,328,331
1920	—	26,280,243		295,771	26,576,016
1921	—	29,523,833		470,615	29,994,448
1922	—	30,222,080		220,435	30,442,515
1923	—	9,566,187		148,474	9,714,661
1924	—	5,257,957		264,388	5,522,345
1925	14,354	5,996,585		265,384	6,276,323
1926	19,300	4,314,414		296,265	4,629,979
1927	45,388	4,233,509		251,758	4,530 655
1928	5,143,150	10,439,794		315,630	15,575,749
1929	3,820,250	11,487,076		203,840	15,511,166
1930	707,400	19,091,308		343,708	20,142,416
1931	600,000	9,708,873		148,872	10,457,745
1932	525,000	3,268,303		120,322	3 913.625

HIGHEST AND LOWEST IRON AND STEEL PRICES, 1914–1932.

	1914.			1920.			1924.			1930.			1931.			1932.			1933. 1st 11 mths.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Marked Iron Bars,	9	0	0	33	10	0	15	0	0	12	10	0	12	10	0	12	0	0	12	0	0
S. Staffs . . .	8	10	0	26	15	0	14	10	0				12	0	0						
Common Iron Bars,	8	2	6	30	0	0	12	10	0	10	15	0	10	15	0	10	0	0	9	15	0
Cleveland . . .	7	10	0	24	5	0	12	0	0				10	0	0	9	15	0			
Steel Ship Plates, ⅜-in.,	7	10	0	24	10	0	10	10	0	8	17	6*	8	17	6*	8	17	6*	8	17	6*
Middlesbrough .	7	0	0	20	0	0	9	10	0	8	15	0*	8	15	0*	8	15	0*	8	15	0*
Steel Ship Plates,	7	5	0	28	5	0	12	10	0	8	15	0*	8	15	0*	8	15	0*	8	15	0*
Glasgow . . .	6	17	6	21	10	0	9	15	0												
Steel Boiler Plates,	8	5	0	31	0	0	14	0	0	10	10	0	10	5	0	9	15	0	9	0	0
Middlesbrough .	8	0	0	28	0	0	13	0	0	9	7	6	8	15	0	8	7	6	8	0	0
Steel Boiler Plates,	7	5	0	31	10	0	14	0	0	10	10	0	10	10	0	9	0	0	9	0	0
Glasgow . . .	7	0	0	24	0	0	13	0	0	10	0	0	8	15	0	8	15	0	8	10	0

* Subject to rebate.

OCEAN DISTANCES FROM THE BRITISH ISLES.

(Steaming Distances in Nautical Miles.)

I.—CONTINENT.

	Archangel.	Christiania.	Copenhagen.	Stockholm.	Danzig.	Hamburg.	Amsterdam.	Rotterdam.	Antwerp.	Havre.	Bordeaux.	Bilbao.	Lisbon.	Gibraltar.
Cardiff .	2,259†	1,060*	1,126*	1,498*	1,400*	839	577	553	541	367	531	561	878	1.145
Glasgow .	2,036†	930†	996†	1,408†	1,280†	490	818	794	782	610	778	808	1,093	1,400
Liverpool .	2,104†	1,005†	1,066†	1,478†	1,340†	942	711	687	675	503	671	701	1,010	1,290
London .	2,106	702	700	1,180	989	427	188	177	180	198	682	712	1,058	1.325
Sunderland	1,755	520	586	998	860	413	258	266	327	397	896	915	1.225	1,615

* South about. † North about.

II.—MEDITERRANEAN, BLACK SEA AND RED SEA.

	Marseilles.	Naples.	Messina.	Malta.	Genoa.	Trieste.	Athens.	Constantinople.	Odessa.	Batoum.	Smyrna.	Alexandria.	Port Said.	Aden.
Cardiff .	1,870	2,080	2,170	2,135	2,039	2,804	2,630	2,910	3,230	3,490	2,765	2,922	3,075	4,515
Glasgow .	2,085	2,295	2,475	2,350	2,254	3,019	2,864	3,125	3,445	3,705	2,980	3,137	3,300	4,730
Liverpool .	1,975	2,265	2,367	2,240	2,144	2,909	2,759	3,069	3,335	3,595	2,870	3,083	3,290	4,620
London .	2,050	2,260	2,354	2,315	2,219	2,984	2,810	3,190	3,410	3,670	2,945	3,122	3,248	4,695
Sunderland	2,222	2,540	2,520	2,511	2,381	3,164	2,990	3,370	3,690	3,950	3,225	3,382	3,445	4,975

III.—AFRICA AND EASTERN ATLANTIC, ETC.

	Azores.	St. Vincent (C.V.I.)	Las Palmas.	Bathurst.*	Freetown.	Lagos.	Ascension.	Loanda.†	St. Helena.	Cape Town.	Durban.	Mauritius.‡	Melbourne ‡ (Australia).	Hobart ‡ (Tasmania).
Cardiff .	1,330	2,345	1,523	2,484	2,838	3,968	3,775	4,841	4,472	5,947	6,721	8,273	11,761	11,785
Glasgow .	1,495	2,560	1,745	2,706	3,059	4,189	3,940	5,056	4,637	6,168	6,942	8,494	11,982	12,006
Liverpool .	1,385	2,450	1,655	2,616	2,962	4,097	3,830	4,946	4,527	6,076	6,850	8,402	11,890	11,914
London .	1,460	2,525	1,699	2,660	3,008	4,138	3,900	5.021	4,597	6,117	6,891	8,443	11,931	11,955
Sunderland	1,740	2,805	1,890	2,851	3,199	4,329	4.185	5,301	4,882	6,308	7,082	8,834	12,122	12,146

* *Via* Teneriffe and Dakar. † *Via* St. Vincent (C.V.I.). ‡ *Via* Cape Town.

IV.—INDIAN OCEAN, ETC. (*via* SUEZ).

	Karachi.	Bombay.	Colombo.	Zanzibar.	Mauritius.	Madras.	Calcutta.	Rangoon.	Singapore.	Batavia.	Freemantle (W. Australia)	Adelaide.	Melbourne.	Hobart.
Cardiff .	5,930	6,150	6,615	6,195	6,825	7,016	7,610	7,845	8,165	8,450	9,745	10,712	11,070	11,100
Glasgow .	6,145	6,365	6.830	6,433	7,040	7,120	7,854	8,060	8,380	8,635	9,960	10,953	11.285	11,315
Liverpool .	6,135	6,255	6,720	6,220	6,930	7,065	7,750	7,955	8,270	8,555	9,850	10,847	11,175	11,330
London .	6.110	6,330	6,535	6,295	7,005	7,040	7,795	7,935	8,345	8,630	9,665	10,890	11,250	11,380
Sunderland	6,390	6,610	6,975	6.575	7,285	7,250	7,986	8,135	8,625	8,815	10.105	11,090	11,420	11,560

V.—CHINA, JAPAN, ETC. (*via* SUEZ).

	Saigon.	Hong Kong.	Shanghai.	Nagasaki.	Yokohama.	Vladivostock.*	Fiji Islands.	Manilla.	Brisbane (via Torres Strait.)	Sydney (N.S.W.)	Auckland (N.Z.)	Wellington (N.Z.)	Honolulu.	San Francisco.
Cardiff .	8,805	9,718	10,470	10.595	11,065	11,250	11,540	9,470	11,788	11,520	12,400	12,420	13,150	13,490
Glasgow .	9,020	9,815	10,712	10,819	11,280	11,414	11,755	9,814	12,028	11,764	12,655	12,660	13,365	13,705
Liverpool .	8,910	9,856	10,665	10,700	11,170	11,355	11,645	9,575	11,924	11,600	12,545	12,560	13,955	13,795
London .	8,985	9,900	10,650	10,775	11,245	11,430	11,720	9,750	11,961	11,708	12,625	12,612	14,010	13,800
Sunderland	9,265	10,060	10,820	11,055	11,525	11,710	12,000	9,930	12,152	11,900	12,790	12,850	14,220	13,950

* *Via* Nagasaki.

VI.—AMERICA.

	Quebec.	Halifax, N.S.	New York.	Boston.	Jamaica.	New Orleans.	Panama.	Colon.	Pernambuco.	Bahia.	Rio de Janeiro.	Montevideo.	Buenos Aires.	Valparaiso.
Cardiff .	2,759	2,505	3,065	2,782	4,030	4,510	4,527	4,487	3,950	4,375	5,020	5,990	6,100	8,690
Glasgow .	2,618	2,390	3 280	3,065	4,245	4,725	4,665	4,625	4,165	4,540	5,235	6,205	6.315	8.905
Liverpool .	2,655	2,455	3,052	2.805	4,135	4,615	4,570	5.530	4,055	4,430	5,125	6,095	6,205	8,795
London .	3,072	2,685	3,245	3,030	4,210	4,790	4,782	4,742	4,130	4,505	5,200	6,370	6,280	8.870
Sunderland	3,240	2,665	3,450	2,803	4,490	4,970	4,975	4,935	4,410	4,785	5,480	6.450	6,560	9.250

PROFILES OF

BRITISH AND FOREIGN WARSHIPS

1

CAPITAL SHIPS.

[In order to facilitate identification, the ships are arranged in accordance **with the number of funnels and masts,** as these are the features most easily distinguished at a distance. Dimensions and particulars of British and foreign warships will be found on pp. 231–302. All the profiles are drawn to the scale ½ in. = 100 ft.]

[Indexes to the names of vessels of which profiles are included in this section are given at the end of the volume.]

FRANCE. Battleships. Condorcet, Diderot, Voltaire.
(Diderot has a tall mainmast.)

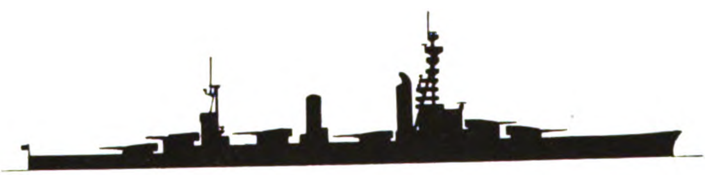
SWEDEN. Battleship. Oscar II.

GREAT BRITAIN. Battle-cruiser. Hood.

GREAT BRITAIN. Battle-cruisers. Renown, Repulse.

JAPAN. Battleships. Mutsu, Nagato.

JAPAN. Battleships. Ise, Hyuga.

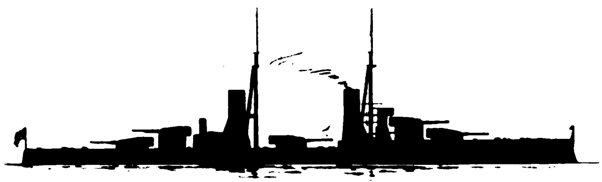


JAPAN. Battleships. Fuso, Yamashiro.

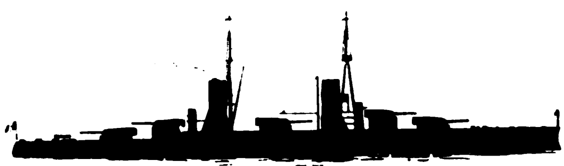
JAPAN. Battleships. Haruna, Kirishima, Kongo.

CHILE. Battleship. Almirante Latorre.
Modernised 1931 – mainmast raised and bridge work altered.

UNITED STATES. Battleships. California, Colorado, Maryland, Tennessee, West Virginia.

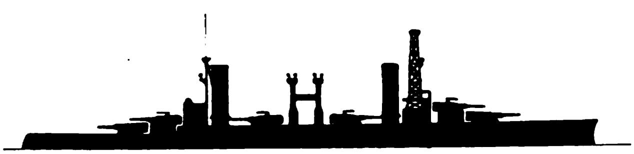


ITALY. Battleships. Andrea Doria, Caio Duilio.

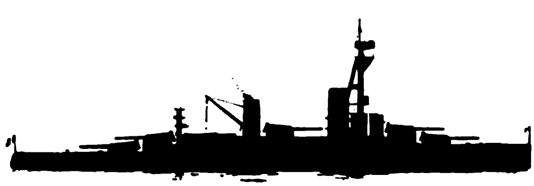


ITALY. Battleships. Conte di Cavour, Giulio Cesare.

UNITED STATES. Battleship. Arkansas.



ARGENTINE. Battleships. Moreno, Rivadavia.



FRANCE. Battleships. Bretagne, Lorraine, Provence.
(Now have tall maintopmasts and no foretopmasts.)

FRANCE. Battleships. Courbet, Jean Bart, Paris.

BRAZIL. Battleships. Minas Geraes, São Paulo.

GREAT BRITAIN. Battleships. Nelson, Rodney.

FRANCE. Battleship. Dunkerque.

GREAT BRITAIN. Battleships. Queen Elizabeth, Warspite, Barham, Valiant, Malaya.

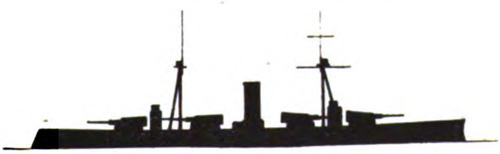
UNITED STATES. Battleships. New York, Texas.

GREAT BRITAIN. Battleships. Ramillies, Resolution, Revenge, Royal Oak, Royal Sovereign.

UNITED STATES. Battleships. Idaho, Mississippi, New Mexico.
(Before modernisation. Now being modernised on same general lines as Arizona and Pennsylvania.)

UNITED STATES. Battleships. Arizona, Pennsylvania.

UNITED STATES. Battleships. Nevada, Oklahoma.

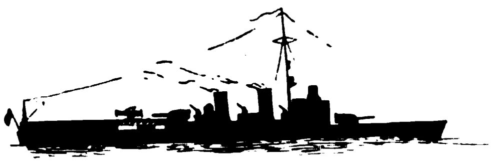


SPAIN. Battleship. Jaime I.

GERMANY. Armoured Ships. Deutschland, Admiral Scheer, Ersatz Braunschweig.

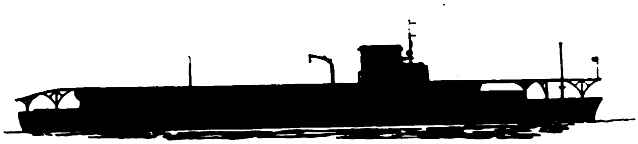
AIRCRAFT AND SEAPLANE CARRIERS AND TENDERS.

GREAT BRITAIN. Aircraft Carrier. Eagle.

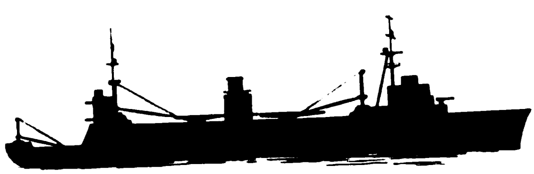


SWEDEN. Aircraft Cruiser. Gotland.

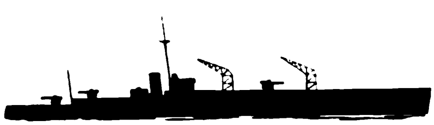
GREAT BRITAIN. Aircraft Carrier. Hermes.



FRANCE. Aircraft Carrier. Béarn.



FRANCE. Aviation Transport. Commandant Teste.



ROYAL AUSTRALIAN NAVY. Seaplane Carrier. Albatross.

UNITED STATES. Aircraft Carriers. Saratoga, Lexington.

GREAT BRITAIN. Aircraft Carriers. Courageous, Glorious.

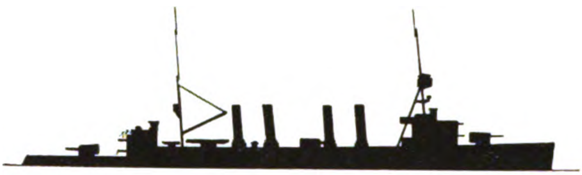
JAPAN. Aircraft Carrier. Hosho.

GREAT BRITAIN. Aircraft Carrier. Furious.

JAPAN. Aircraft Carrier. Akagi.

CRUISERS AND COAST DEFENCE SHIPS.

JAPAN. Cruisers. ("Sendai" class.) Naka, Sendai, Jintsu.



UNITED STATES. Scout Cruisers. ("Omaha" class.) Cincinnati, Concord, Detroit, Marblehead, Memphis, Milwaukee, Omaha, Raleigh, Richmond, Trenton.

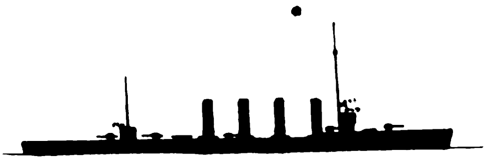
(There are small differences in the arrangement of guns aft.)

JAPAN. Cruisers. ("Chikuma" class). Hirado, Yahagi.

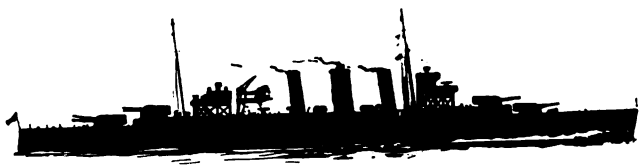
ROYAL AUSTRALIAN NAVY. Cruiser. Adelaide.

ITALY. Armoured Cruisers. (Classified as Battleships, 2nd class, in Italian official lists.) San Giorgio, San Marco.

ITALY. Light Cruiser. Taranto (*ex-German* Strassburg).

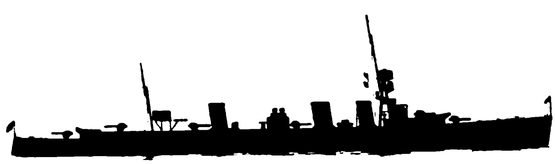


FRANCE. **Light Cruiser.** **Thionville** (*ex-Austrian* **Novara**). Italian cruisers **Brindisi** (*ex-Austrian* **Helgoland**) and **Venezia** (*ex-Austrian* **Saida**) are practically similar.
(The torpedo tubes are fitted right aft.)



GREAT BRITAIN. **Cruisers.** (" **London** " **class.**) **Devonshire, London, Shropshire, Sussex.** (" **Norfolk** " **class.**) **Dorsetshire, Norfolk.**

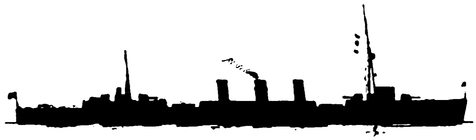
GREAT BRITAIN. **Cruisers.** ("**Kent**" **class.**) **Berwick, Cornwall, Cumberland, Kent, Suffolk.**
COMMONWEALTH OF AUSTRALIA. **Cruisers.** (" **Kent** " **class.**) **Australia, Canberra.**



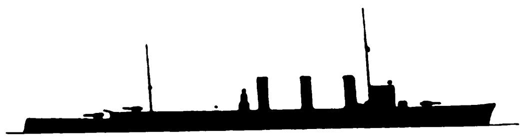
GREAT BRITAIN. **Cruisers.** (" **E** " **class.**) **Emerald, Enterprise.**
(In **Enterprise** the forward 6-in. guns are in a twin mounting on the forecastle deck.)

JAPAN. **Light Cruisers.** (" **Kuma** " **class.**) **Kiso, Kitakami, Kuma, Oi, Tama.** (" **Natori** " **class.**) **Isudzu, *Natori, *Nagara, *Yura, *Kinu, *Abukuma.**
* Has aircraft hangar incorporated in bridge structure.

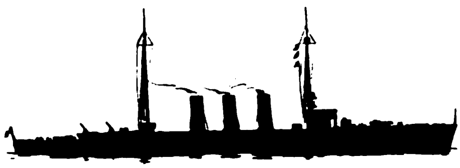
FRANCE. **Light Cruiser.** **Metz** (*ex-German* **Königsberg**).



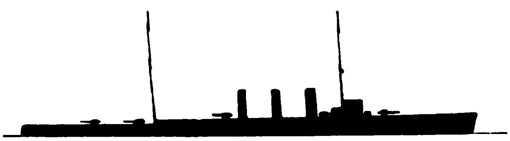
JAPAN. Light Cruisers. ("Tenryu" class.) Tatsuta, Tenryu.



SPAIN. Light Cruiser. Mendez Nuñez.

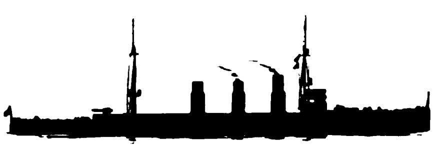


FRANCE. Light Cruiser. Strasbourg (*ex-German* Regensburg).



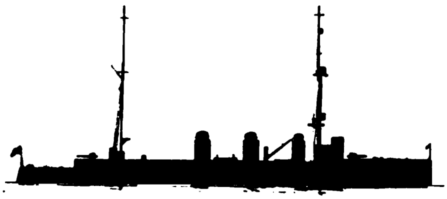
SPAIN. Light Cruiser. Republica.

ITALY. Light Cruiser. Ancona (*ex-German* Graudenz).

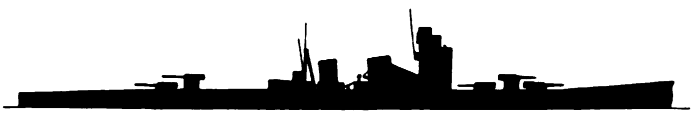


ITALY. Light Cruiser. Bari (*ex-German* Pillau).

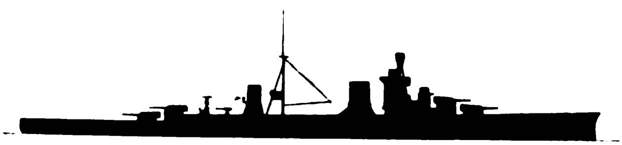
GREAT BRITAIN. Cruiser. ("Caroline" class.) Comus.



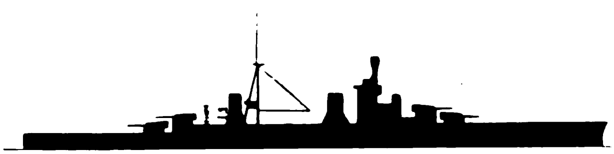
ITALY. Scout Cruiser. Quarto.



JAPAN. Cruisers. ("Nachi" class.) Nachi, Myoko, Ashigara, Haguro. ("Takao" class.) Atago, Takao, Chokai, Maya.
(In the "Takao" class the after funnel is vertical.)



ITALY. Cruiser. (Modified "Trento" class.) Bolzano.

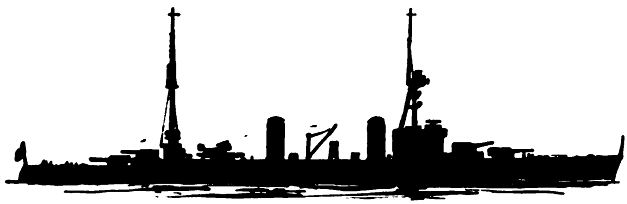


ITALY. Cruisers. ("Zara" class.) Pola, Zara, Fiume, Gorizia.

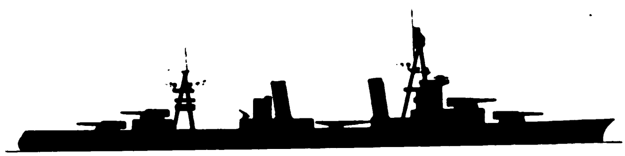
JAPAN. Cruisers. ("Furutaka" class.) Furutaka ,Kato.
(The tops of the funnels are square to the funnels).

JAPAN. Cruisers. (" Furutaka " class.) Aoba, Kinugasa.
(The tops of the funnels are square to the funnels.)

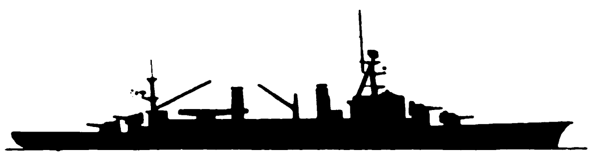
GREAT BRITAIN. Cruisers. (Improved " Birmingham " class.) Effingham, Frobisher, Hawkins, Vindictive.)
(In **Vindictive** the raised 7·5-in. gun forward is removed and a hangar fitted forward of the bridge.)



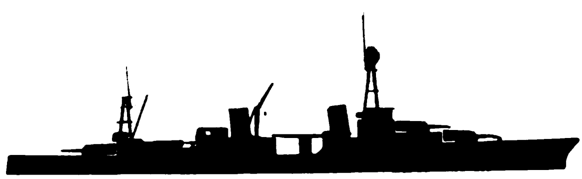
FRANCE. Cruisers. (" Duquesne " class.) Duquesne, Tourville. (" Suffren " class.) Suffren, Colbert, Foch, Dupleix.
(**Colbert, Dupleix** and **Foch** have tripod mainmasts and the catapults between the funnels.



UNITED STATES. Cruisers. (" Pensacola " class.) Salt Lake City, Pensacola.



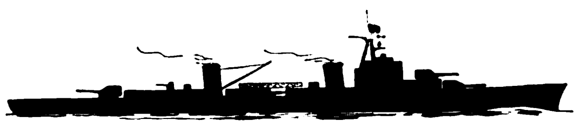
FRANCE. Training Cruiser. Jeanne d'Arc.
(The catapults are removed).



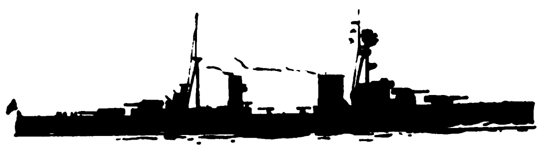
UNITED STATES. Cruisers. (" Chester " class.) Northampton, Chester, Louisville. ("Augusta " class.) Chicago, Houston, Augusta. (" Portland " class.) Portland, Indianapolis.

GREAT BRITAIN. Cruisers. York and Exeter. ("York" class.
(In Exeter the funnels and masts are vertical.)

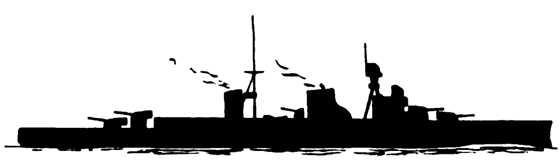
GERMANY. Light Cruisers. Köln, Karlsruhe, Konigsberg.



FRANCE. Cruiser Minelayer. Emilé Bertin.

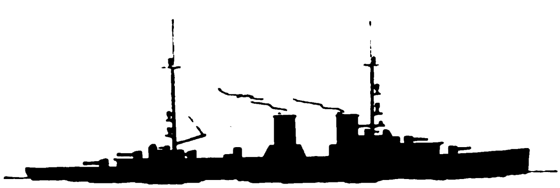


ITALY. Cruisers. ("Condottieri" class.) Alberico de Barbiano, Alberto di Giussano, Bartolomeo Colleoni, Giovanni della Bande Nere.



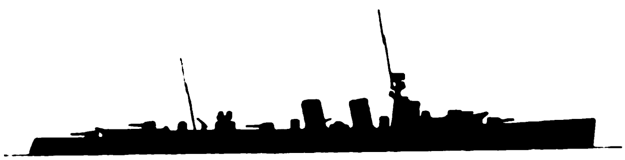
ITALY. Cruisers. ("Condottieri" class.) Armando Diaz, Luigi Cadorna.

GREAT BRITAIN. Cruiser Minelayer. Adventure.

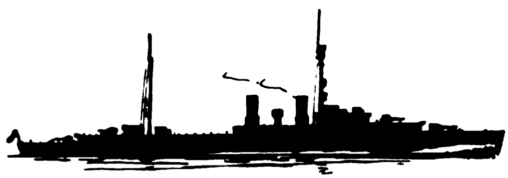


NETHERLANDS. Cruisers. Java, Sumatra.

ITALY. Cruisers. ("Trento" class.) Trento, Trieste.

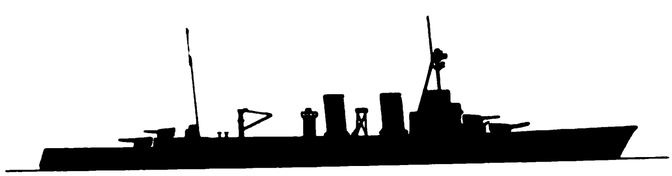


SPAIN. Cruisers. Libertad, Almirante Cervera, Miguel de Cervantes.
(The mainmasts are tripods).

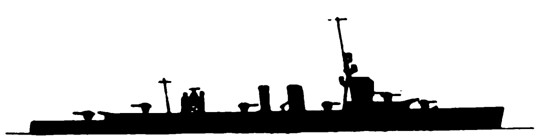


GERMANY. Light Cruiser. Emden.

FRANCE. Cruiser Minelayer. Pluton.



FRANCE. Cruisers. ("Duguay-Trouin" class.) La Motte Picquet, Duguay-Trouin, Primauguet.

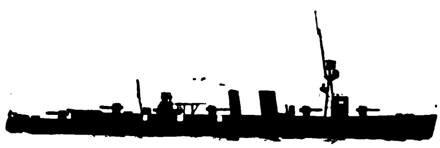


GREAT BRITAIN. Cruisers. ("D" class.) Danae, Dauntless, Dragon.

GREAT BRITAIN. **Cruisers.** **("D" class: repeat vessels.)** **Delhi, Dunedin, Diomede, Despatch, Durban.**

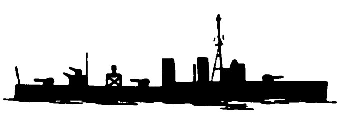
GREAT BRITAIN. **Cruisers.** **("Ceres" class.)** **Cardiff, Ceres, Coventry, Curacoa, Curlew.**

GREAT BRITAIN. **Cruisers.** **("Carlisle" class.)** **Cairo, Calcutta, Capetown, Carlisle, Colombo.**

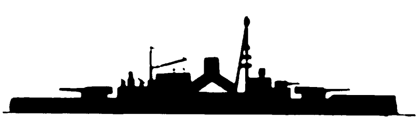


GREAT BRITAIN. **Cruisers.** **("Caledon" class.)** **Caledon, Calypso, Caradoc.**
("Centaur" class.) **Concord.**

GREAT BRITAIN. **Cruisers.** **("Cambrian" class.)** **Cambrian, Canterbury, Castor, Constance, Champion.**

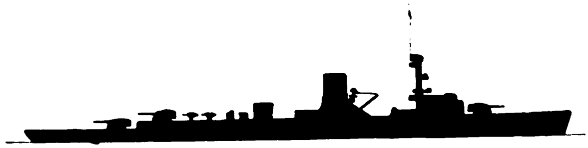


GREECE. **Cruiser.** **Helle.**

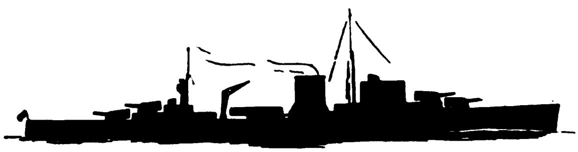


SWEDEN. **Coast Defence Ships.** **Gustav V, Sverige.**
(**Drottning Victoria** at present has two funnels and a tripod mainmast, but is to be reconstructed and modernised as above.)

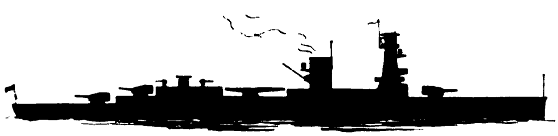
FRANCE. Cruiser. Algérie.



GERMANY. Light Cruiser. Leipzig.



GREAT BRITAIN. Cruisers. (" Leander " class.) Leander, Achilles, Neptune, Orion.



NETHERLANDS. Cruiser. Celebes.

ARGENTINE. Cruisers. Almirante Brown, Vintecinco de Maio.

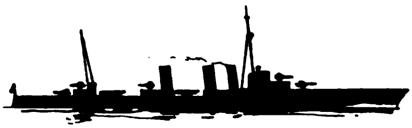
JAPAN. Light Cruiser. Yubari.

FINLAND. Armoured Gunboats. Vaïnämöinen, Ilmarinen.

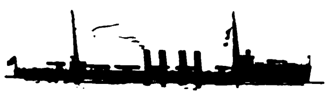
FLOTILLA LEADERS AND DESTROYERS.

(See pp. 277–302.)

FRANCE. Flotilla Leaders. Bison, Guépard, Lion, Vauban, Valmy, Verdun, Aigle, Vautour, Albatros, Gerfaut, Vauquelin, Kersaint, Cassard, Tartu, Maillé Brézé, Le Chevalier-Paul.



FRANCE. Flotilla Leaders. Jaguar, Panthère, Léopard, Lynx, Chacal, Tigre.



UNITED STATES. Destroyers. Aylwin, Balch, Benham, Duncan, Parker, Cassin, Cummings and Downes.

Sampson, Rowan, Davis, Allen, Wilkes, Shaw, Tucker, Conyngham, Porter, Wadsworth, Wainwright, O'Brian, Nicholson, Winslow, McDougal, Cushing and Ericsson, are generally similar.

UNITED STATES. Destroyers. The "Flush Deck" type; all U.S. destroyers except those in the preceding silhouette and those with three funnels.

FRANCE. Destroyers. Téméraire, Opiniâtre.

FRANCE. Destroyers. Enseigne Roux, Mécanicien Principal Lestin.

FRANCE. Destroyer. Enseigne Gaboide.

FRANCE. Destroyers. Forbin, Frondeur, Fougueux, Foudroyant, Basque, Bordelais, Boulonnais, Brestois, L'Ardroit, L'Alcyon, Le Fortune, Le Mars, La Palme, La Railleuse, Bourrasque, Orage, Ouragan, Simoun, Cyclone, Mistral, Sirocco, Tempête, Tramontane, Typhon, Trombe, Tornade.

POLAND. Destroyers. Burza, Wicher, are similar.

UNITED STATES. Destroyers. Caldwell, Stockton, Connor, Gwin.

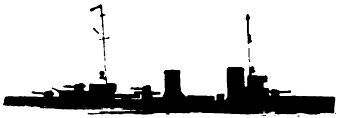
GREAT BRITAIN. Destroyers. (Admiralty "R" class.) Tempest, Tetrarch, Thisbe, Thruster, Torrid, Skate, Rowena, Restless, Salmon.

FRANCE. Destroyers. Algérien, Annamite, Arabe, Bambara, Hova, Kabyle, Marocain, Sakalave, Sénégalais, Somali, Tonkinois, Touareg.

ITALY. Destroyers. Gen. A. Cantore, Gen. A. Chinotto, Gen. A. Papa, Gen. A. Cascino, Gen. M. Prestinari, Gen. C. Montanari, A. Bassini, E. Cosenz, F. Stocco, G. Carini, G. Medici, G. Acerbi, G. la Farina, G. la Masa, G. Sirtoti, N. Fabrizi, V. Orsini.

YUGO SLAVIA. Flotilla Leader. Dubrovnik.

JAPAN. **1st Class Destroyers. "Fubuki" class.** (24 ships.)



FRANCE. Flotilla Leader. Amiral Sénès.

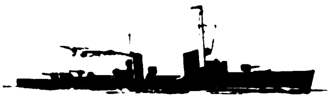
ITALY. Flotilla Leaders (Scouts). Nicoloso Da Recco and class. (12 ships.)

ITALY. Flotilla Leaders (Scouts). Leone, Pantera, Tigre.

SPAIN. Flotilla Leaders. Almirante Valdés, Alm. Antequera, Alm. Miranda, Charruca, A. Galiano, Lepanto, Alm. Ferrandiz, José Luis Diez, S. Barcaiztegui.

JAPAN. 1st Class Destroyers. "Mutsuki" class (12 ships), **and "Kamikase" class** (9 ships).

JAPAN. 1st class Destroyers. "Minekase" class (15 ships).



GERMANY. Destroyers. Iltis, Wolf, Tiger, Luchs, Jaguar, Leopard, Seeadler, Greif, Albatros, Kondor, Falke, Möwe.

GREAT BRITAIN. Flotilla Leader. Codrington.

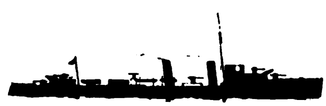
GREAT BRITAIN. Destroyers. "Acasta," "Beagle," "Crusader" and "Defender" classes.

Flotilla Leaders. Keith, Duncan and Kempenfelt.

PORTUGAL. Destroyers. Douro, Téjo, Vouga, Lima, Dao.

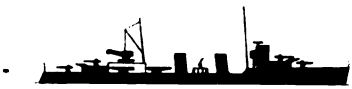
ARGENTINE. Flotilla Leaders. Mondoza, La Rioja, Tucuman.

ITALY. Flotilla Leaders (Scouts). Carlo Mirabello, Augusto Riboty.



GREAT BRITAIN. Flotilla Leaders. Broke. Keppel, Shakespeare, Spenser, Wallace, Bruce, Douglas, Campbell, Mackay, Malcolm, Montrose, Stuart. [In Stuart the torpedo tubes are removed.]

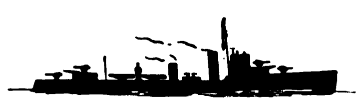
SPAIN. Flotilla Leaders. Almiranté Valdes, etc., generally similar.



HOLLAND. Destroyers. De Ruyter, Evertsen, Piet Hein, Kortenaer, Banckert, Van Nes, Van Galen, Witte de With.

GREAT BRITAIN. Destroyers. Vansittart, Venomous, Verity, Volunteer, Wanderer, Veteran.

GREAT BRITAIN. Destroyers. Vanessa, Vanity, Vanoc, Vanquisher, Vectis, Vega, Velox, Vendetta, Venetia, Venturous, Verdun, Versatile, Vesper, Vidette, Vimiera, Violent, Vivacious, Vivien, Vimy (*late* Vancouver), Vortigern, Valhalla, Valentine, Valkyrie, Valorous, Vampire, Viceroy, Viscount, Voyager, Wakeful, Walker, Walpole, Walrus, Warwick, Watchman, Waterhen, Wessex, Westcott, Westminster, Whirlwind, Whitley, Winchelsea, Winchester, Wolfhound, Wolsey, Woolston, Wrestler, Wryneck.



GREAT BRITAIN. Destroyers. Whitehall, Whitshed, Wildswan, Witherington, Wivern, Wolverine, Worcester, Wishart, Witch.

GREAT BRITAIN. Destroyers. Ambuscade, Amazon.

CHILE. Destroyers. Serrano, Orella, Riquelme, Hyatt, Videla, Aldea.

SWEDEN. Destroyers. Klas Horn, Klas Uggla, Ehrensköld, Nordenskjold.

JAPAN. 2nd class Destroyers. "Wakatake" class (7 ships), and "Kaya" class (19 ships).

JAPAN. 2nd Class Destroyers. Momo, Yanagi Kashi, Hinoki.

FRANCE. Destroyers. Aventurier, Intrépide.

ITALY. Destroyers. Q. Sella, B. Ricasoli, F. Crispi, G. Nicotera.

ITALY. Destroyers. Alessandro Poerio and Guglielmo Pepe.

GREAT BRITAIN. Destroyers. Admiralty "S" class.

ITALY. Destroyers. Palestro, Solferino, San Martino, Confienza.

ITALY. Destroyers, Turbine. Nembo, Euro, Borea, Espero, Ostro, Zeffiro, Aquilone, N. Sauro, F. Nullo, D. Manin, C. Battisti.

ITALY. Destroyers. Dardo, Freccia, Strale. Saetta, Folgore, Lampo, Baleno, Fulmine.

DENMARK. Torpedo Boats (1st Class). Glentin, Hogen, Ornen, Laxen, Dragen, Hvalen.

GREECE. Destroyers. Hydra, Spetzai, Psara and Coundouriotis.

PLANS

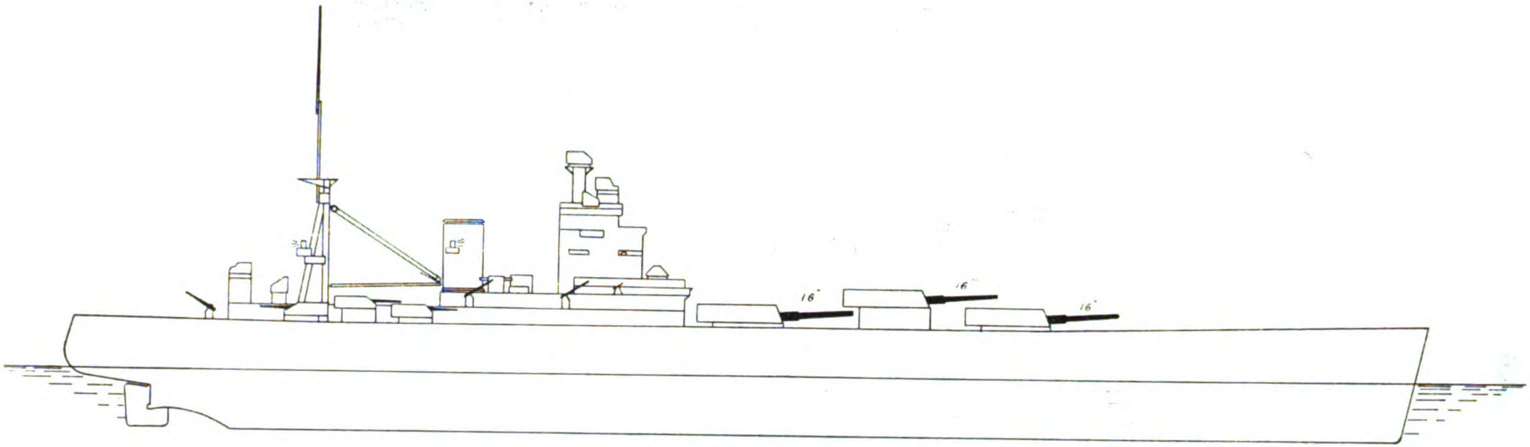
OF

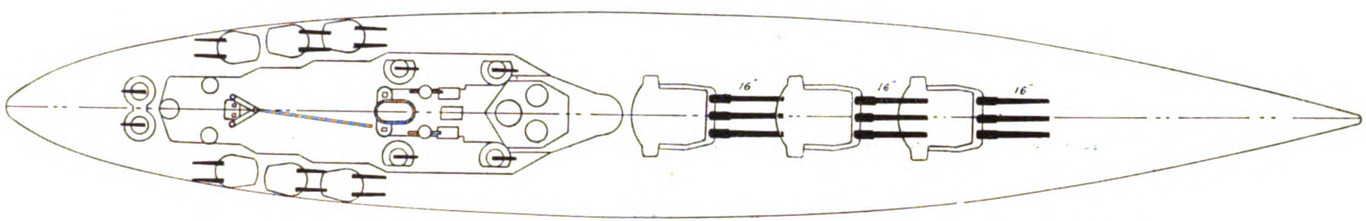
BRITISH AND FOREIGN WARSHIPS.

GREAT BRITAIN.

BATTLESHIPS.

Nelson. **Rodney.**





Length (extreme), 710 ft.; Rodney, 33,900 tons; Nelson, 33,500 tons; Speed, 23 knots.

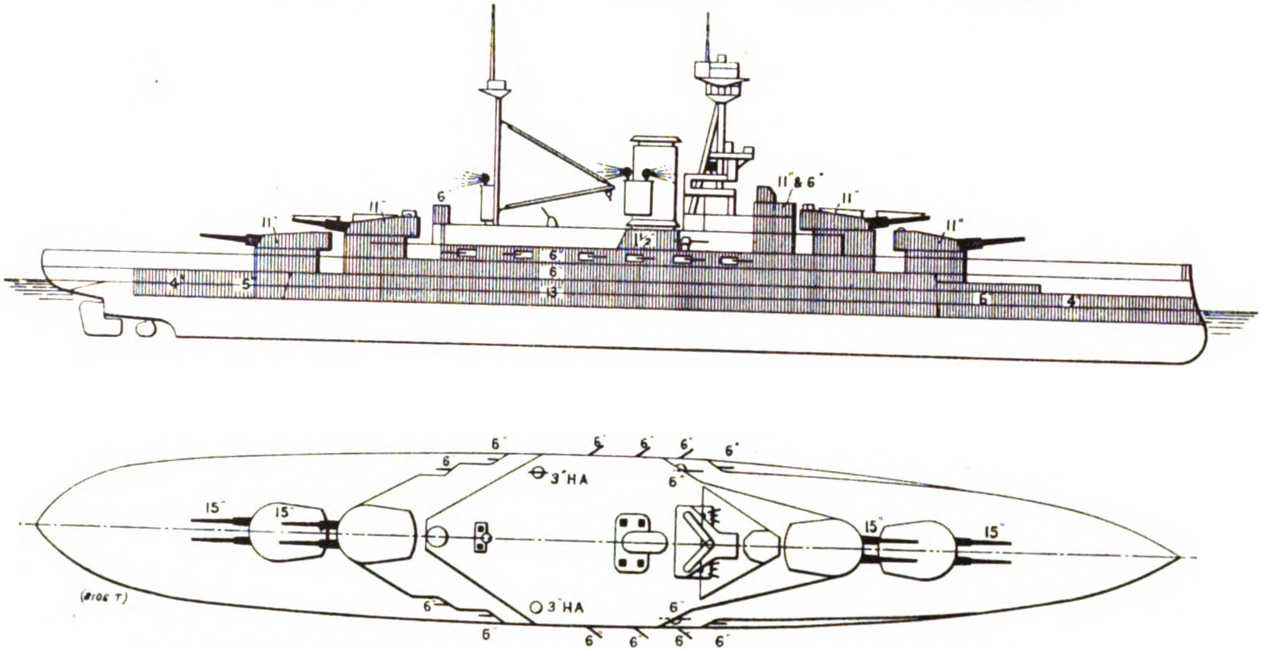
Armament, 9—16-in.; 12—6-in.; 6—4·7-in. A.A.; 4—3-pr.; 6—2-pr. Pom Poms; 11 L.; 5 M.; 2 24-in. submerged torpedo tubes.

NOTE.—A 14-in. waterline armour belt extends from approximately the foremost 16-in. turret to approximately the aftermost 6-in. turret. The turret armour varies from 16-in. to 9-in

GREAT BRITAIN.

BATTLESHIPS.

Royal Sovereign. Royal Oak. Revenge. Resolution. Ramillies.



Length (extreme), 620 ft. 6 ins.* ; Length B.P., 580 ft. ; 29,150 tons ; Speed, 23 knots (without bulges) ; Completed, 1916–17.
Armament, 8—15 in. ; 12—6 in. ; 4—4-in. A.A. ; 4—3-pr. ; 5 M ; 11 L. ; 2—21-in. submerged torpedo tubes.

Corrections to plan :—Searchlights on mainmast and the superstructure 6-in. guns now removed. Four 4-in. A.A. guns are fitted on the superstructure instead of the 3-in. H.A. shown.

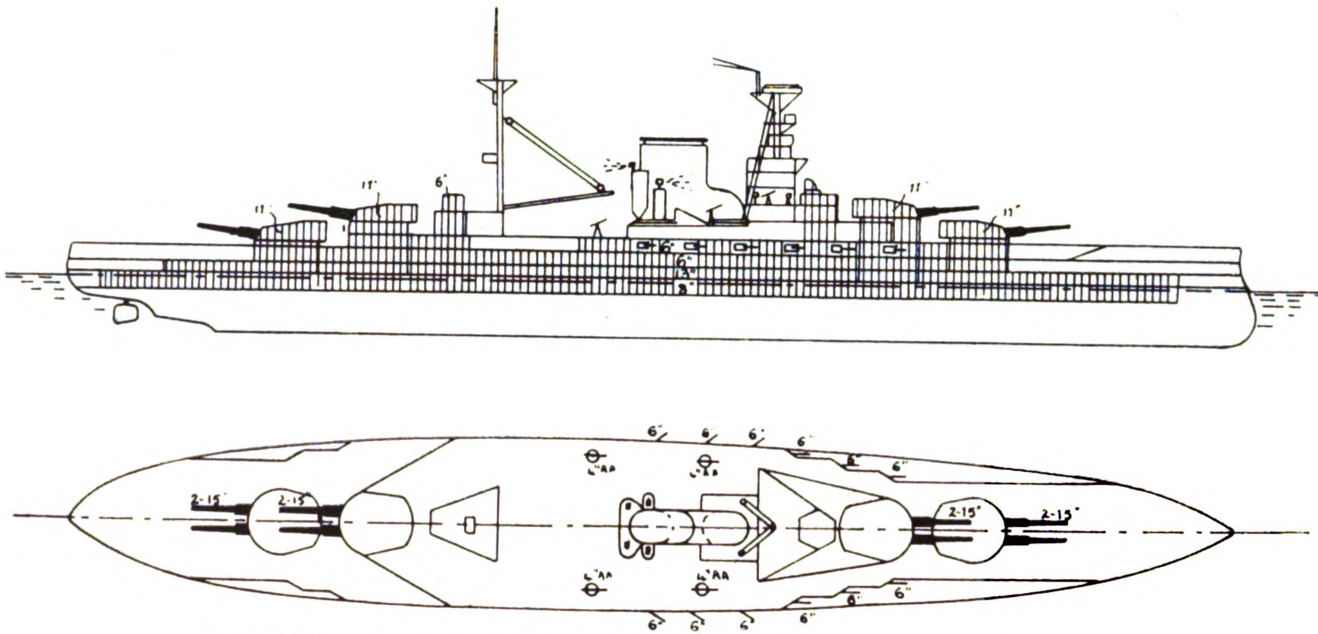
* Revenge, 625 ft. 9 in.

GREAT BRITAIN.

BATTLESHIPS.

Queen Elizabeth. Warspite. Barham. Valiant. Malaya.

(As reconstructed 1926–31.)

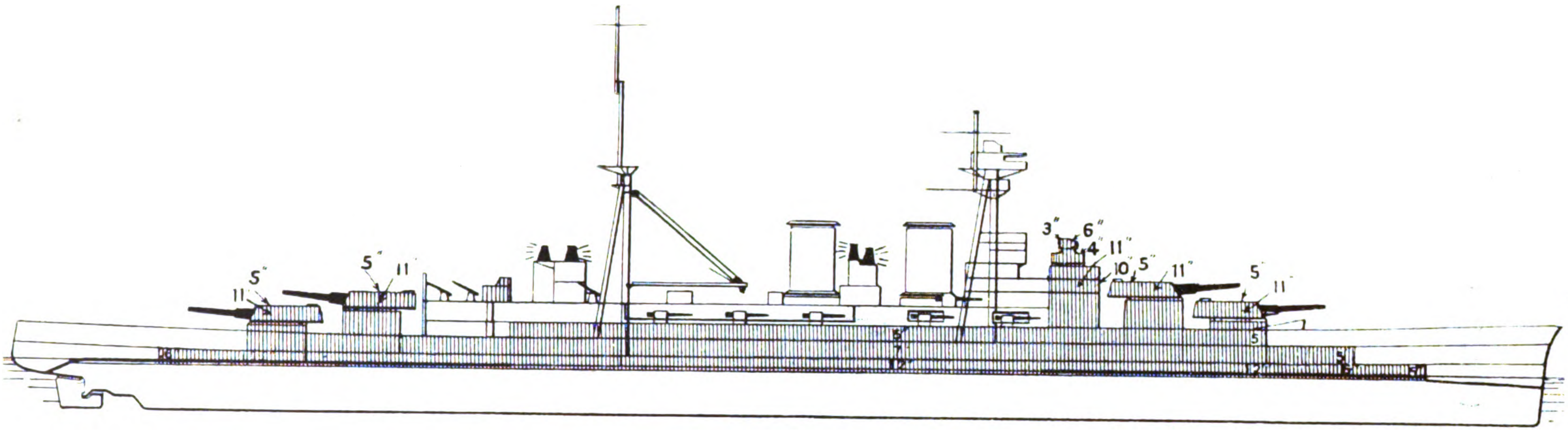


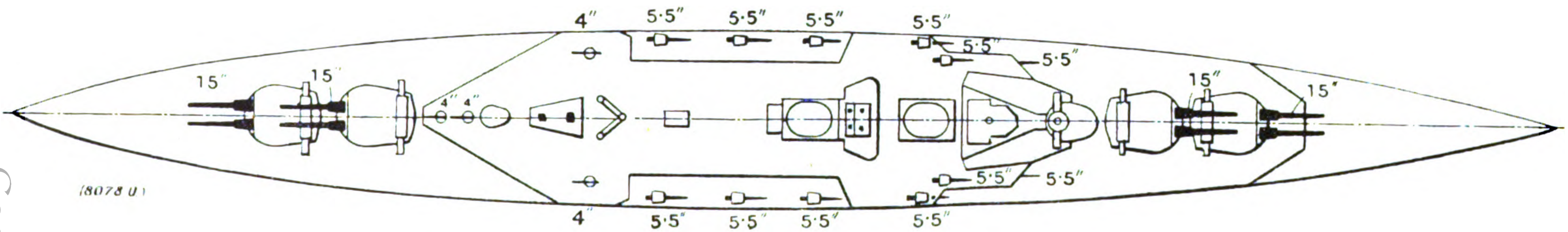
Length B.P., 600 ft.; (extreme 639¾–644½ ft.); 31,100 tons; Speed, 25 knots (without bulges); Completed, 1915–1916.
Armament, 8—15-in.; 12—6-in.; 4—4-in. A.A.; 4—3-pr.; 5 M.; 11 L.; 2—21-in. submerged torpedo tubes.

GREAT BRITAIN.

BATTLE-CRUISER.

Hood.





(8078 U)

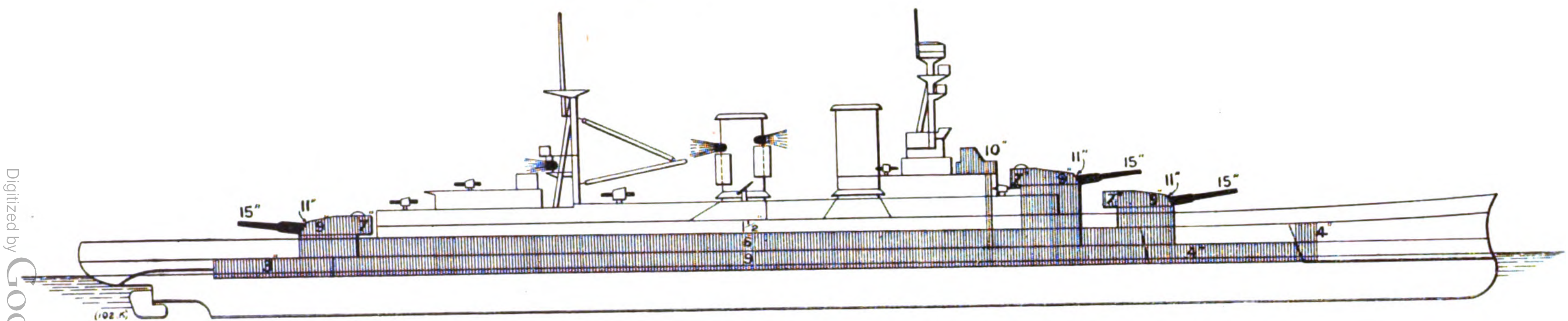
Length (extreme), 860 ft. 10 ins. ; Length B.P., 810 ft. ; 42,100 tons; Speed, 31* knots; Completed, 1920.
Armament, 8—15-in. ; 12—5·5-in. ; 4—4-in A.A. ; 4—3-pdr. ; 5 M. ; 11 L. ; 4 A.W. and 2 sub. 21-in. torpedo tubes.

* Trials at 44,600 tons, 31·89 knots with 151,000 S.H.P.

GREAT BRITAIN.

BATTLE-CRUISERS.

Repulse. Renown.



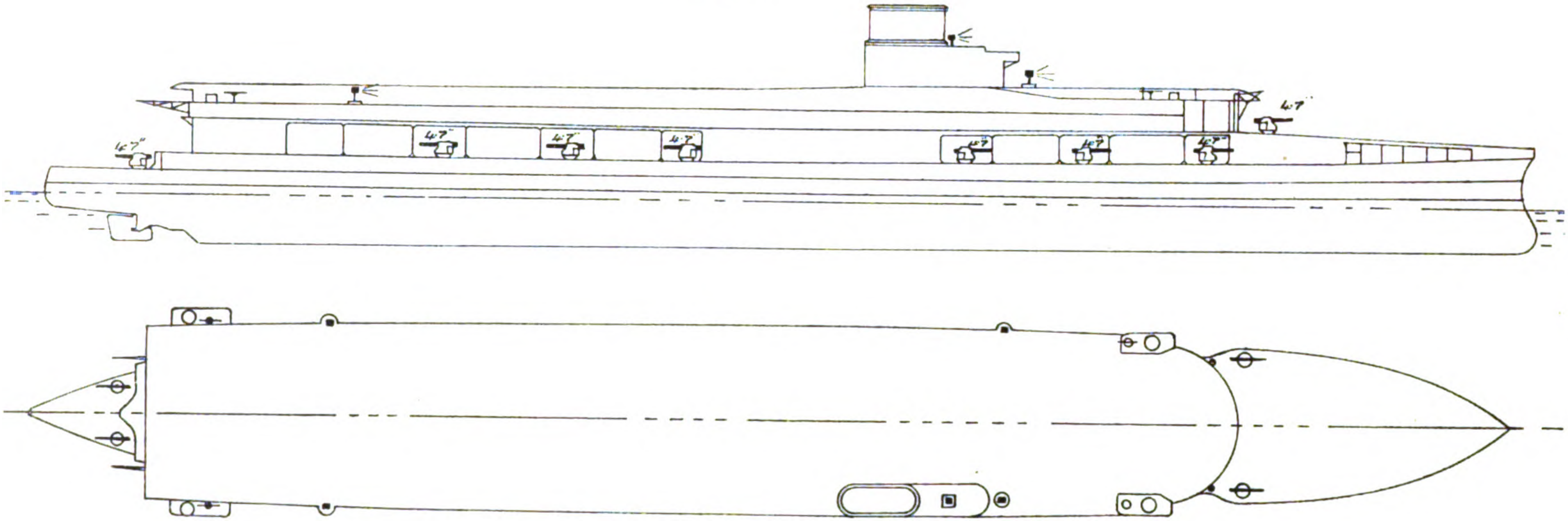
Length (extreme), 794 ft. 2 ins.; Length B.P., 750 ft.; 32,000 tons; Speed, 31·5 knots (without bulges); Completed, 1916.
Armament, 6—15-in.; 15—4-in.; 4—3-pr.; 4—4-in. A.A.; 5 M.; 11 L.; 2 submerged torpedo tubes (Repulse, 8 a.w. in addition).

NOTE.—Repulse originally had a 6-in. main belt, but was re-armoured in 1920–21. Re-armouring of the Renown was completed during 1926.

GREAT BRITAIN.

AIRCRAFT CARRIERS.

Courageous. Glorious.

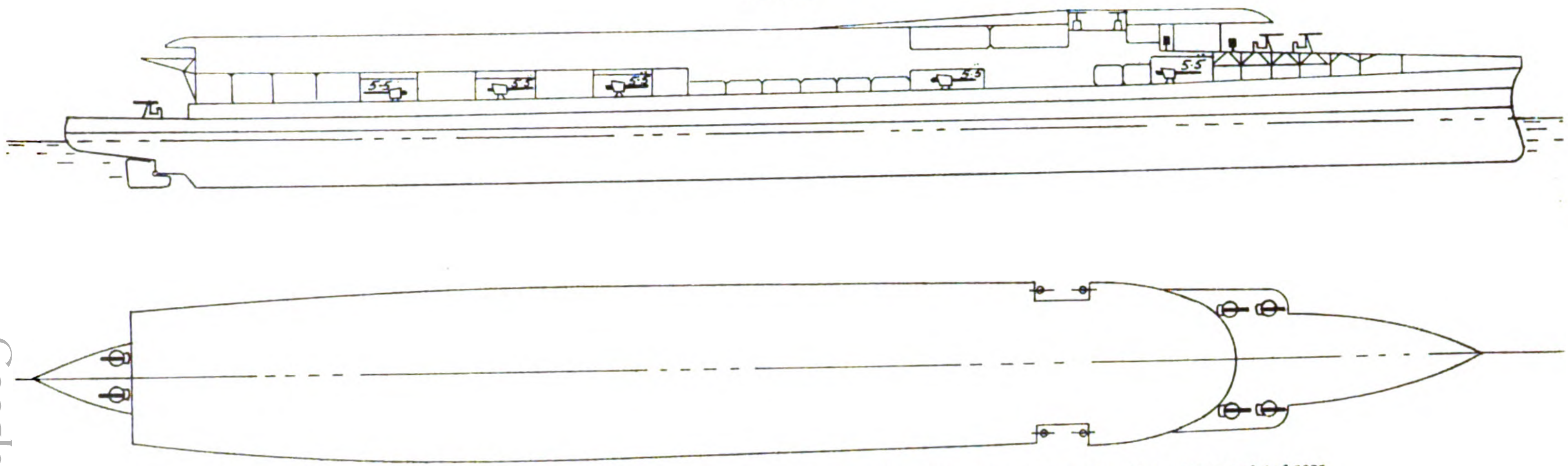


Length (extreme), 786 ft. 3 ins. ; 22,500 tons ; Speed, 30½ knots ; Launched as crusiers (1916) ; converted to aircraft carriers (completed 1928 and 1930 respectively)
Armament, 16—4·7-in. ; 4—3-pr. ; 4—2-pr. Pom Poms ; 4 M. ; 42 L.

GREAT BRITAIN.

AIRCRAFT CARRIER.

Furious.

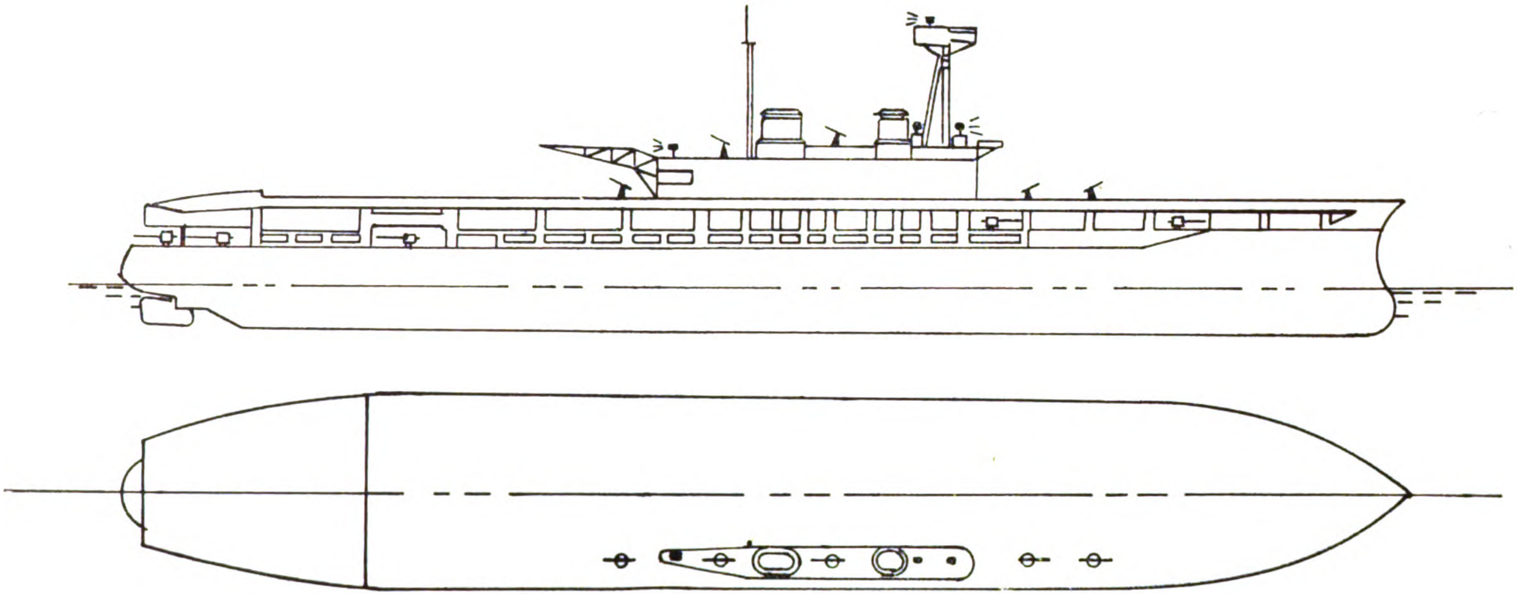


Length (extreme), 786 ft. 6 ins.; 22,450 tons; Speed, 31 knots; Completed as a cruiser, 1917; Conversion to aircraft carrier completed 1925.
Armament, 10—5·5-in.; 3—4-in. A.A.; 4—3-pr.; 4—2-pr.; 46 smaller.

GREAT BRITAIN.

AIRCRAFT CARRIER.

Eagle.

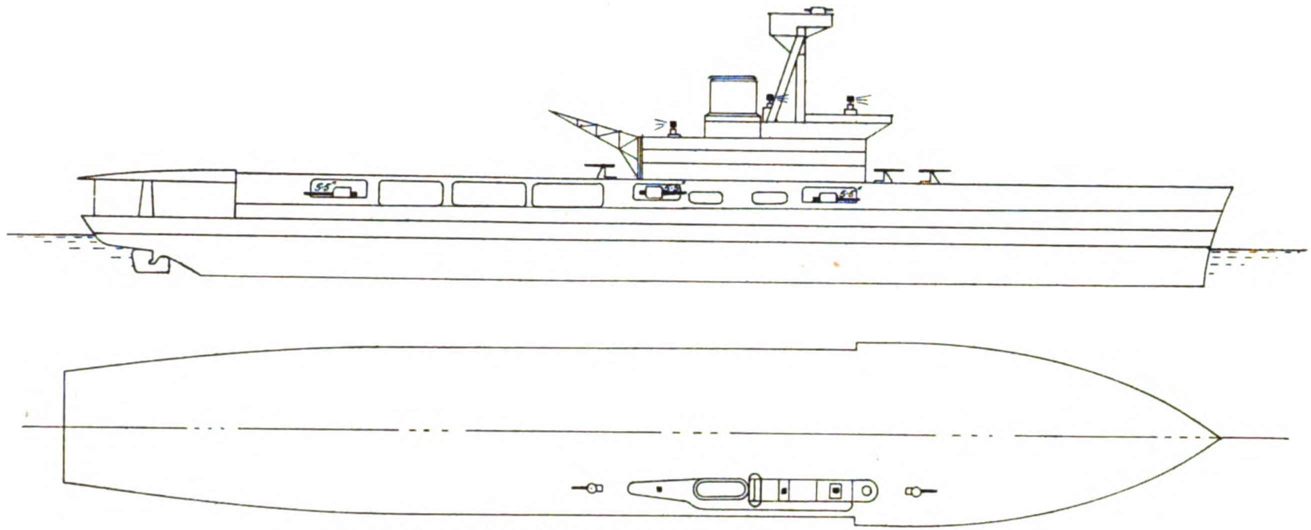


Length (extreme), 667 ft. 6 ins.; 22,600 tons; Speed, 24 knots; Completed as an aircraft carrier, 1924.
Armament, 9—6-in.; 5—4-in. A.A.; 4—3-pr.; 32 smaller.

GREAT BRITAIN.

AIRCRAFT CARRIER.

Hermes.



Length (extreme), 599 ft. 6 ins.; 10,850 tons; Speed, 25 knots; Completed 1924.
Armament, 6—5·5-in.; 3—4-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 4 M.; 16 L.

GREAT BRITAIN.

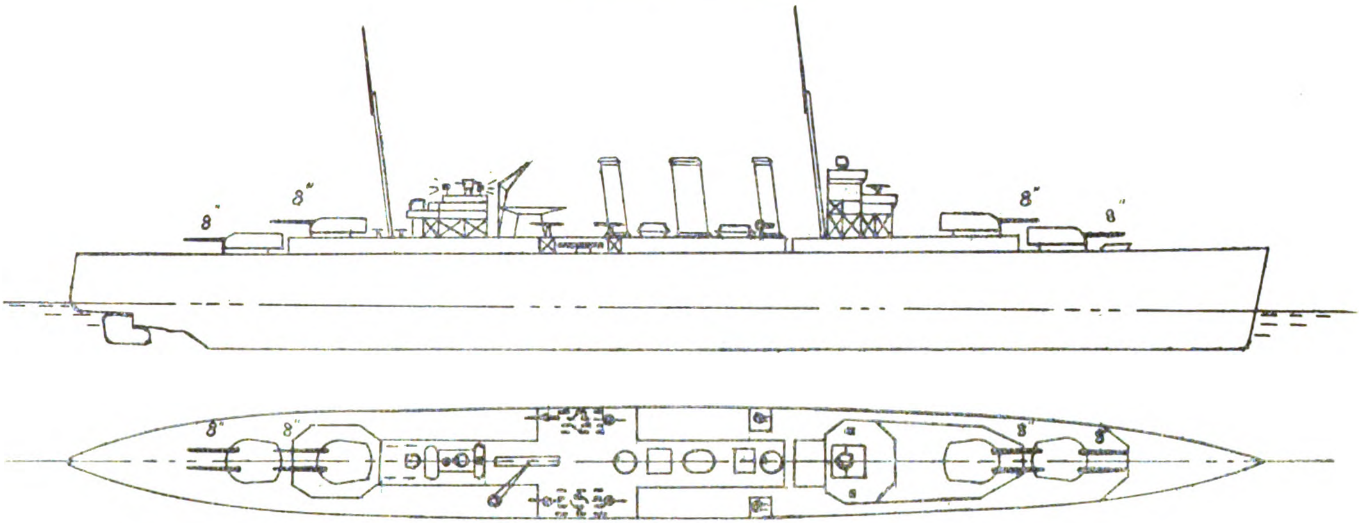
CRUISERS.

"London" Class.

London. Sussex. Shropshire. Devonshire.

"Norfolk" Class.

Dorsetshire.* Norfolk.*



Displacements, 9,730—9,900 tons; Length (extreme), 630 ft.; Norfolk and Dorsetshire, 633 ft. Armament, 8—8-in.; 4—4-in. A.A.; 4—3-pr.; 4—2-pr. Pom Poms; 4 M.; 8 L.; 8—21-in. torpedo tubes.

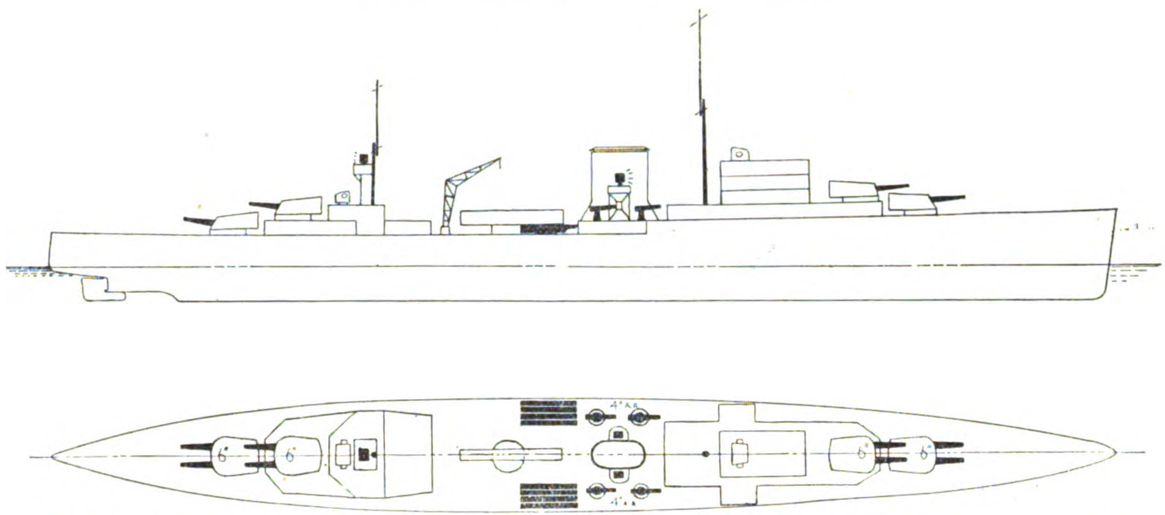
* In Dorsetshire and Norfolk the seaplane crane and the 4—4-in. guns are slightly forward of the positions shown.

GREAT BRITAIN.

CRUISERS.

"Leander" Class.

Leander. Achilles. Neptune. Orion.



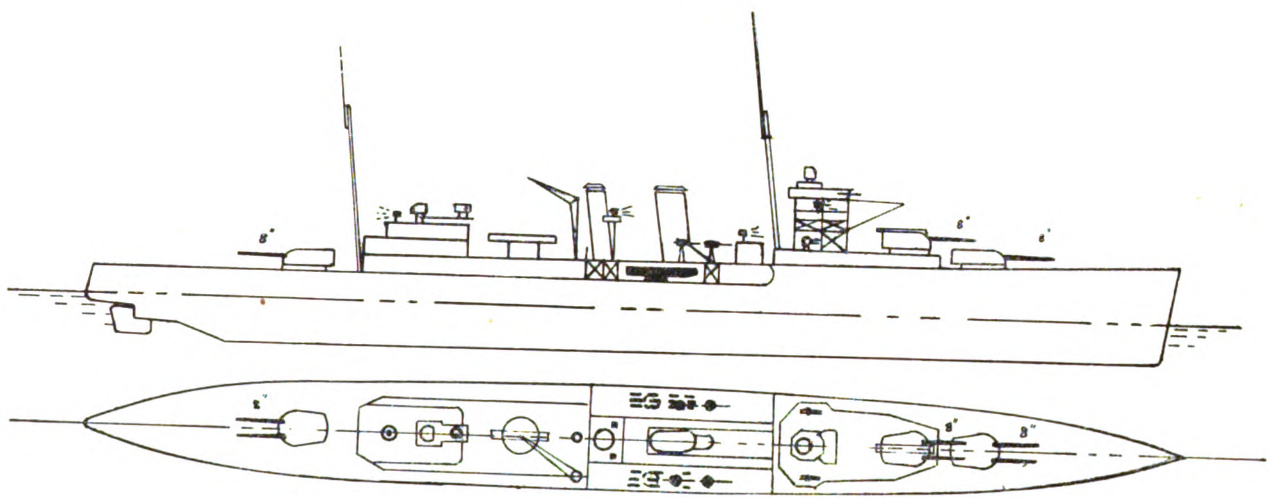
Displacement, 7,000 tons; Length (extreme), 554 ft. 6 ins.; Speed 32½ knots. Armament 8—6-in., 4—4-in. A.A., 4—3-pr., 8 torpedo tubes.
Leander and Achilles, completed 1933. Neptune and Orion, building (estimated to complete 1934).

GREAT BRITAIN.

CRUISERS.

"York" Class.

York. Exeter.*



Displacement: York, 8,250 tons; Exeter, 8,390 tons; Length (extreme), 575 ft.; Speed: York, $32\frac{1}{4}$ knots; Exeter, 32 knots. Armament, 6—8-in.; 4—4-in. A.A; 4—3-pr.; 2—2-pr.; 4 M; 8 L.; 6—21-in. torpedo tubes.

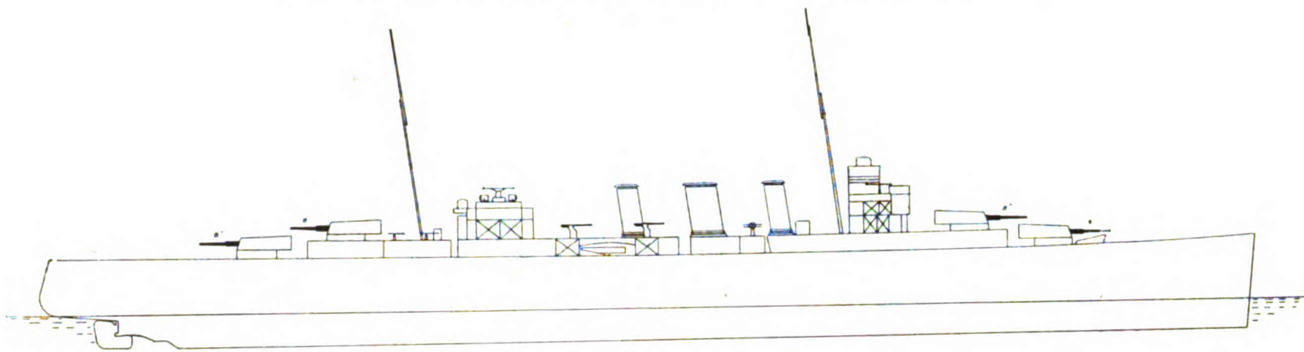
* In Exeter funnels and masts are vertical, and the mainmast is taken up through the superstructure.

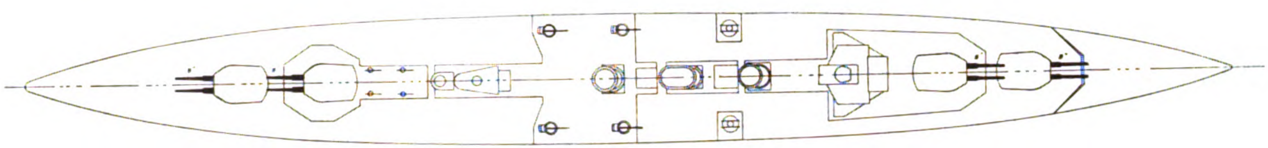
GREAT BRITAIN.

CRUISERS.

"Kent" Class.

Kent. Berwick. Cumberland. Suffolk. Cornwall. Australia.* Canberra.*





Length (extreme), 630 ft.; B.P., 590 ft.; 9,750 to 9,870 tons; Speed, 31¼ knots.
Armament, 8—8-in.; 4—4-in. A.A.; 4—3-pr.; 4—2-pr. Pom Poms; 4 M.; 8 L.; 2 Q.R. 21-in. torpedo tubes.

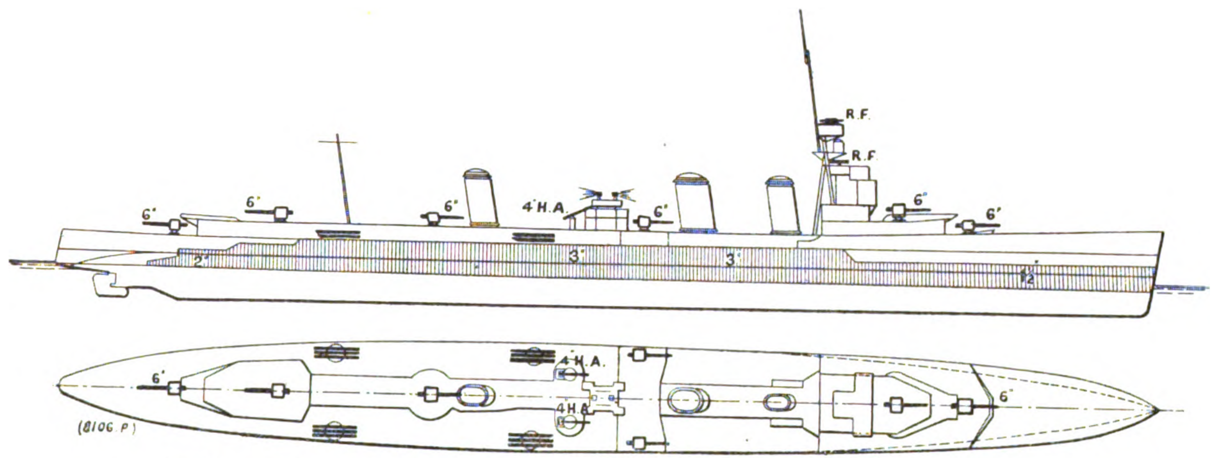
* H.M. Australian Navy.

GREAT BRITAIN.

CRUISERS.

"E" Class.

Emerald. **Enterprise.***



Length (extreme), 570 ft. ; Length B.P., 535 ft. ; Emerald, 7,550 tons ; Enterprise, 7,580 tons ; Speed, 33 knots.
Armament, 7—6-in. ; 3—4-in. A.A. ; 4—3-pr. ; 2—2-pr. Pom Poms ; 2 M. ; 8 L. ; 16—21-in. torpedo tubes.

Correction to plan : The torpedo tubes are in quadruple sets.

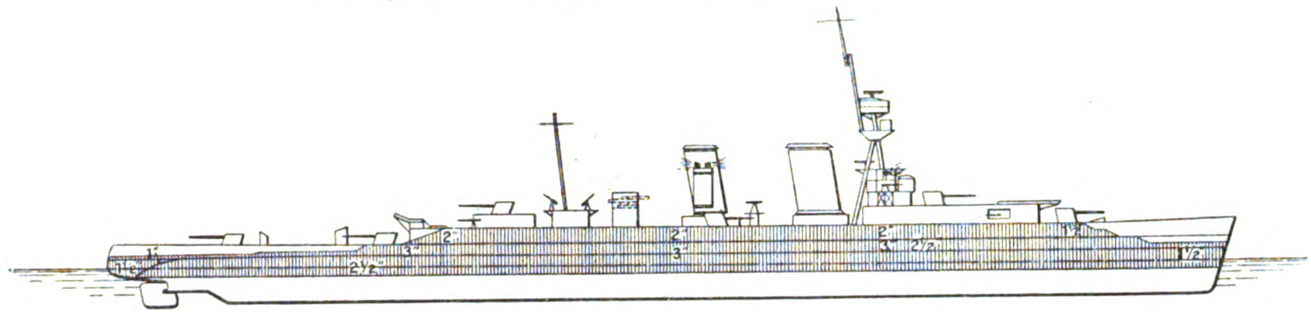
* In Enterprise the two forward 6-in. guns are mounted in a twin-mounting on forecastle deck.

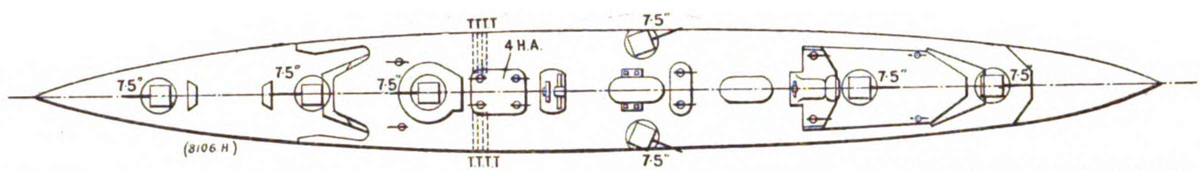
GREAT BRITAIN.

CRUISERS.

Improved "Birmingham" Class.

Effingham. Hawkins. Frobisher. Vindictive.*





Length (extreme), 605 ft.; Length B.P., 565 ft.; 9,770—9,996 tons; Speed: Effingham and Frobisher 30½ knots; Vindictive 30 knots: Hawkins 29½ knots. Armament: Effingham: 7—7·5-in.; 3—4-in. A.A.; 4—3-pr.; 2—2-pr.; 2 M.; 8 L.; 5 torpedo tubes. Frobisher: 6—7·5-in.; 2—4-in. A.A.; 4—3-pr.; 2 M.; 8 L.; 2 torpedo tubes. Hawkins: 7—7·5-in.; 4—4-in. A.A.; 4—3-pr.; 2—2-pr.; 2 M.; 8 L.; 6 torpedo tubes. Vindictive: 6—7·5-in.; 3—4-in. A.A.; 4—3-pr.; 2—2-pr.; 2 M.; 2 L.; 6 torpedo tubes.

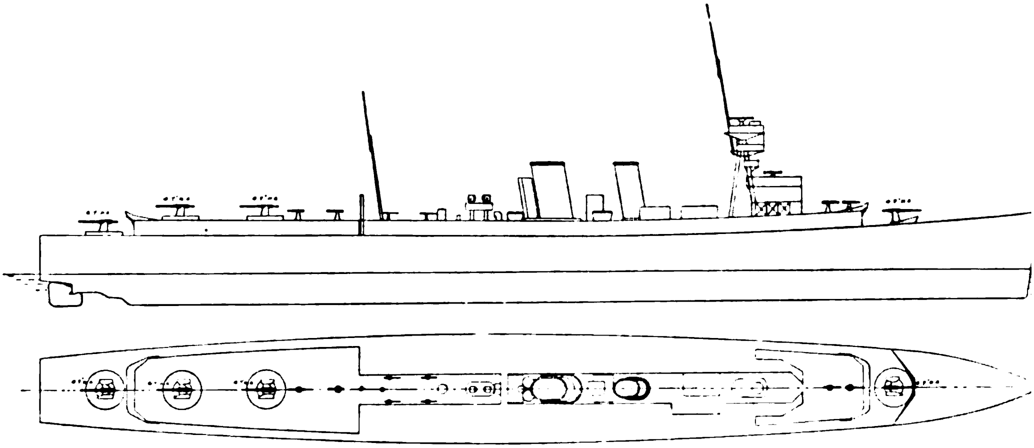
* Vindictive has an aircraft hangar mounted forward of the bridge, and to accommodate this the raised 7·5-in. gun forward has been removed.

Frobisher is now employed as Cadets' Sea-going Training Ship.

GREAT BRITAIN.

CRUISER MINELAYER.

Adventure.

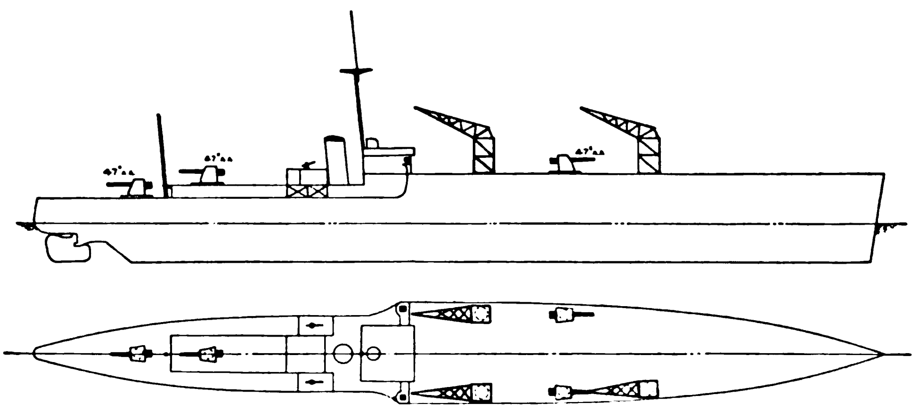


Length (extreme), 521 ft.; Length B.P., 500 ft.; 6,740 tons; Speed, 27¾ knots.
Armament, 4–4·7-in. A.A.; 4—3-pr.; 4—2-pr.; 2 M.; 8 L.; 310 mines.

ROYAL AUSTRALIAN NAVY.

SEAPLANE CARRIER.

Albatross.



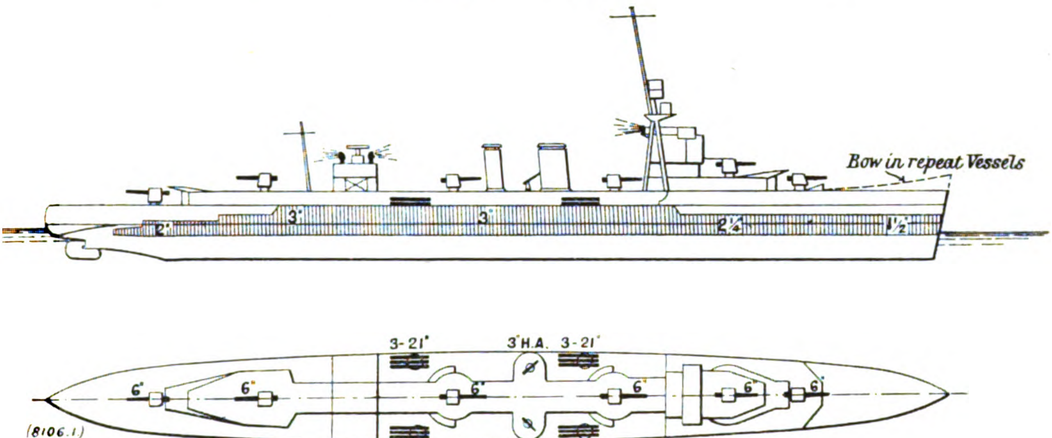
Length, 443¾ ft.; 4,800 tons; Speed, 21 knots; Completed 1929.
Armament, 4—4·7-in. A.A.; 4—2-pdr. Pom Poms; 4—3-pdr.; 4 M.; 4 L.; 6 seaplanes.

GREAT BRITAIN

CRUISERS.

"D" Class.

***Despatch.** ***Diomede.** **Danae.** ***Dunedin.** **Dauntless.** ***Durban.** **Dragon** ***Delhi.**



Length, 472¼ ft.; 4,850 tons; Speed, 29 knots;
Armament, 6—6-in.; 3—4-in. A.A.; 4—3-pr., 2—2-pr.; 2 M.; 8 L.; 12—21-in. torpedo tubes.

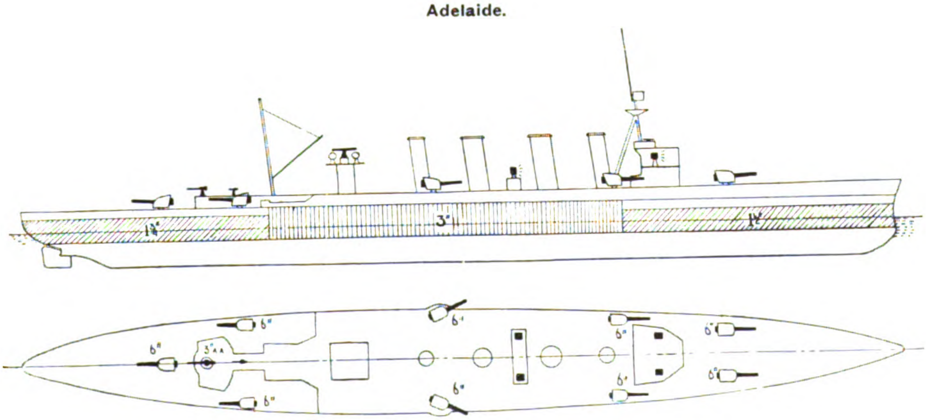
Diomede and Dunedin are now attached to the New Zealand Division.

* Repeat vessels.

ROYAL AUSTRALIAN NAVY.

CRUISER.

Adelaide.



Length, 462½ ft.; 5,100 tons; 25 knots.
Armament, 9—6-in.; 4—3 pr.; 1—3-in. A.A.; 2 submerged 21-in. torpedo tubes.

GREAT BRITAIN.

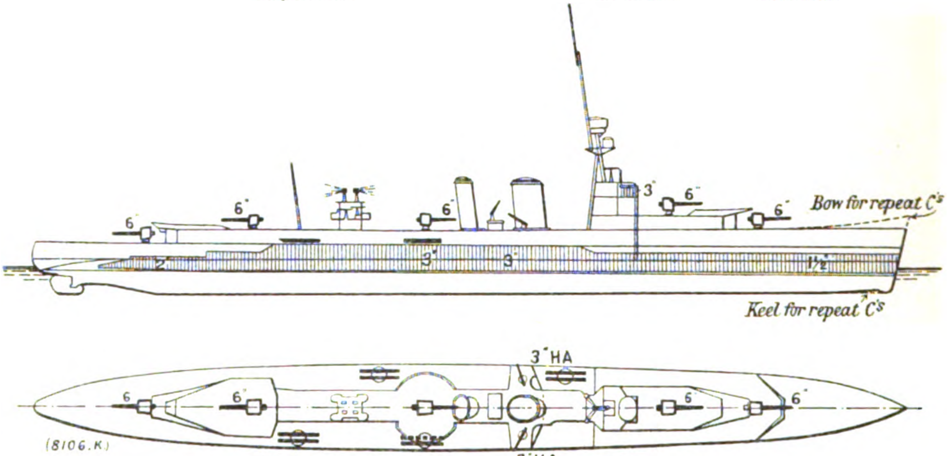
CRUISERS.

"Ceres" Class.

Ceres. Curacoa. Curlew. Cardiff. Coventry.

"Carlisle" Class.

*Cairo. *Cape Town. *Carlisle. *Colombo. *Calcutta.



Length (extreme), 450 ft. (451 ft. 9 ins. Repeat Vessels); Length B.P., 425 ft.; 4,290 tons; Repeat vessels, 4,200 tons; Speed, 29 knots; Completed, 1917–18 (Repeat Vessels, 1918–22).
Armament, 5—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 4 above-water 21-in. D.R. torpedo tubes.
Cardiff, Curacoa, and Ceres have 2—3-pr.
* Repeat vessels.

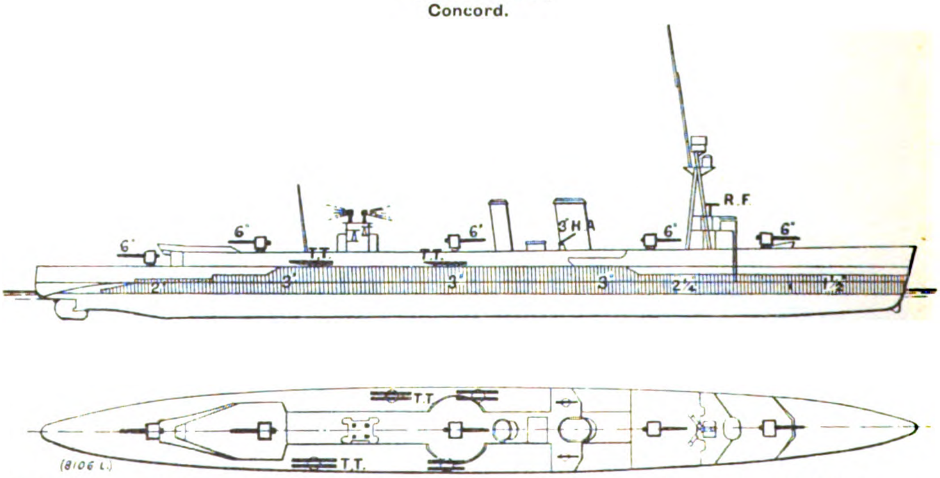
CRUISERS.

"Caledon" Class.

Caledon. Calypso. Caradoc.

"Centaur" Class. †

Concord.



Caledon, Calypso, Caradoc — Length (extreme), 450 ft.; Length B.P., 425 ft.; 4,180 tons; Speed, 29 knots; Completed, 1917. Armament, 5—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 2 M.; 8 L.; and 4 above-water 21-in. D.R. torpedo tubes.

These Plans apply generally to Concord, but there are differences in detail, as stated below.

Concord — Length (extreme), 446 ft. 4 ins.; Length B.P., 420 ft.; 4,120 tons; Speed, 29 knots; Completed, 1916. Armament, 3—6-in.; 2—3-in. A.A.; 2—3-pr.; 2—2-pr. Pom Poms; 2 M.; 8 L.; and 2 submerged 21-in. torpedo tubes.

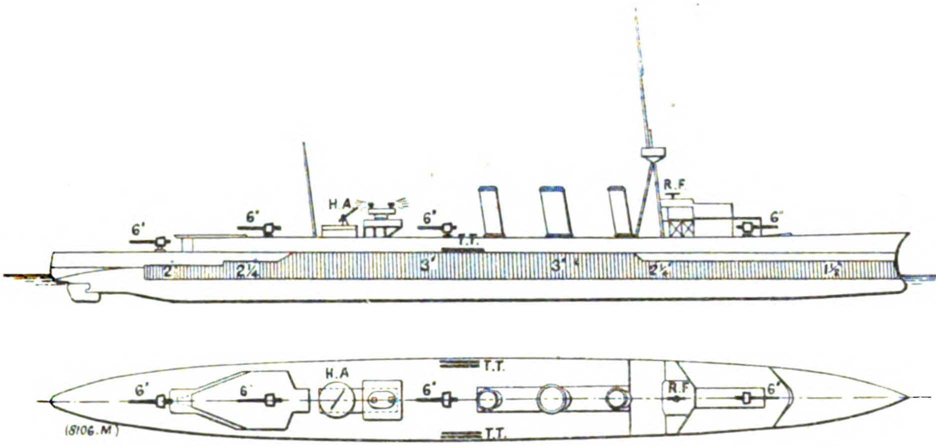
† Centaur of this class is on the sale list.

GREAT BRITAIN.

CRUISER.

"Caroline" Class.

Comus.

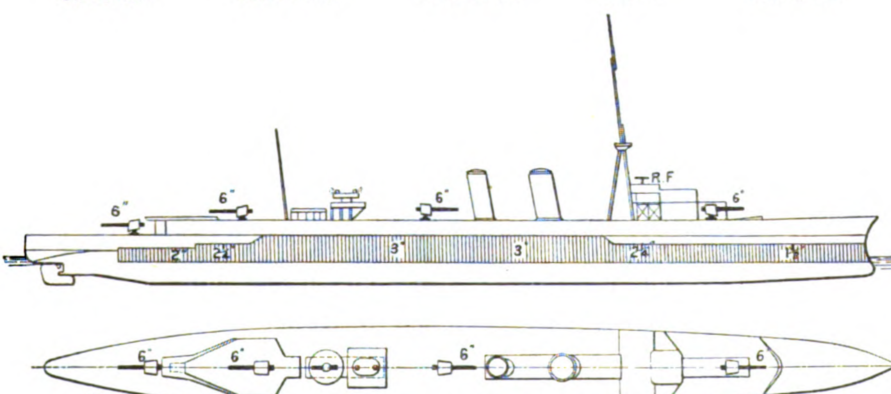


Length (extreme), 446 ft. 4 ins.; Length B.P., 420 ft.; 3,895 tons; Speed, 29 knots; Completed, 1915.
Armament, 4—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 above-water 21-in. D.R. torpedo tubes.

CRUISERS.

"Cambrian" Class.

Cambrian. **Canterbury.** **Constance.** **Castor.** **Champion.**



Length (extreme), 446 ft. 6 ins.; Length B.P., 420 ft.; 3,920 tons; Speed, 29 knots; Completed, 1915–16.

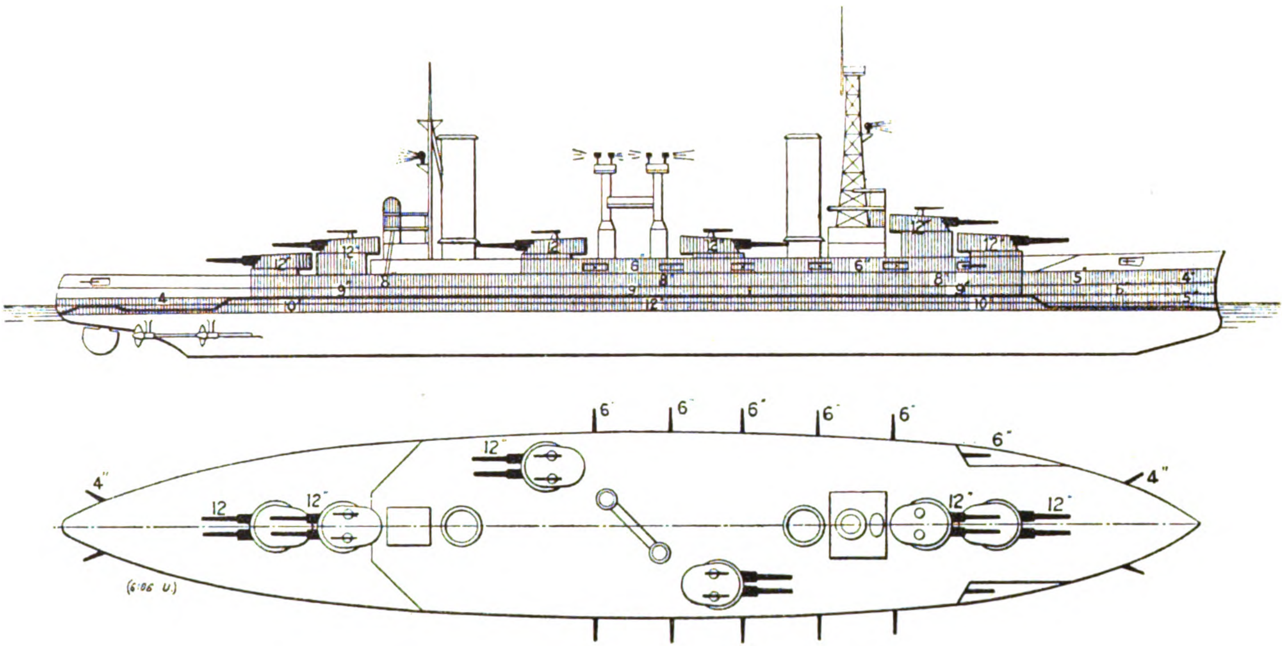
Cambrian
Canterbury
Constance
Castor
} Armament, 4—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 submerged 21-in. torpedo tubes.

Champion Armament, 4—6-in.; 1—3-in. A.A.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 submerged 21-in. torpedo tubes.

ARGENTINE.

BATTLESHIPS.

Moreno. Rivadavia.

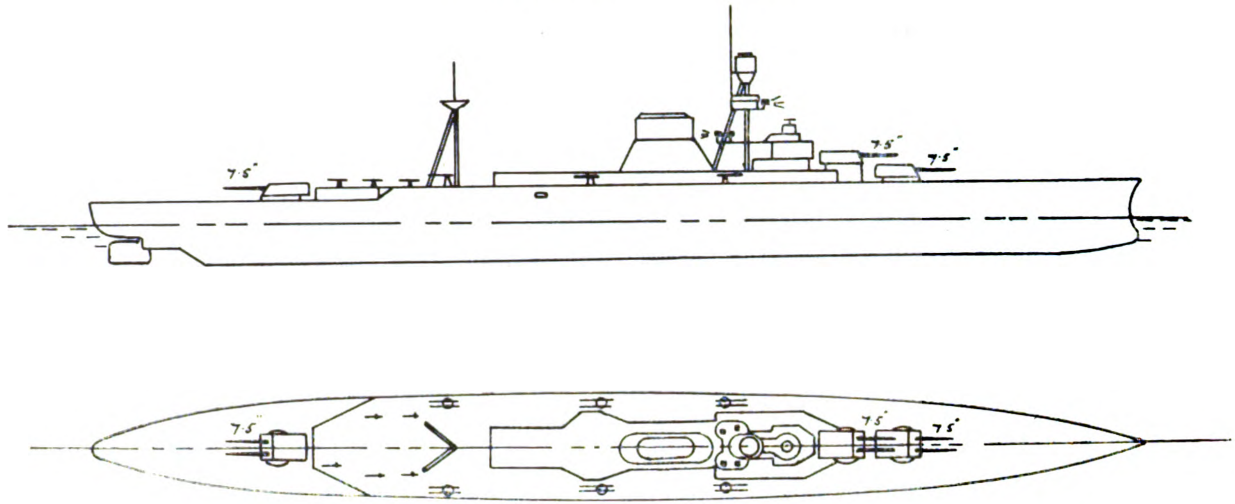


Length (extreme), 585 ft. ; Length on W.L., 575 ft. ; 27,940 tons ; Speed, 22¼ knots ; Completed, 1914-15.
Armament, 12—12-in. ; 12—6-in. ; 4—3-pr. ; 6 M. ; 4 L. ; 2 submerged 21-in. torpedo tubes.

ARGENTINE.

CRUISERS.

Almirante Brown. 25 Maio.

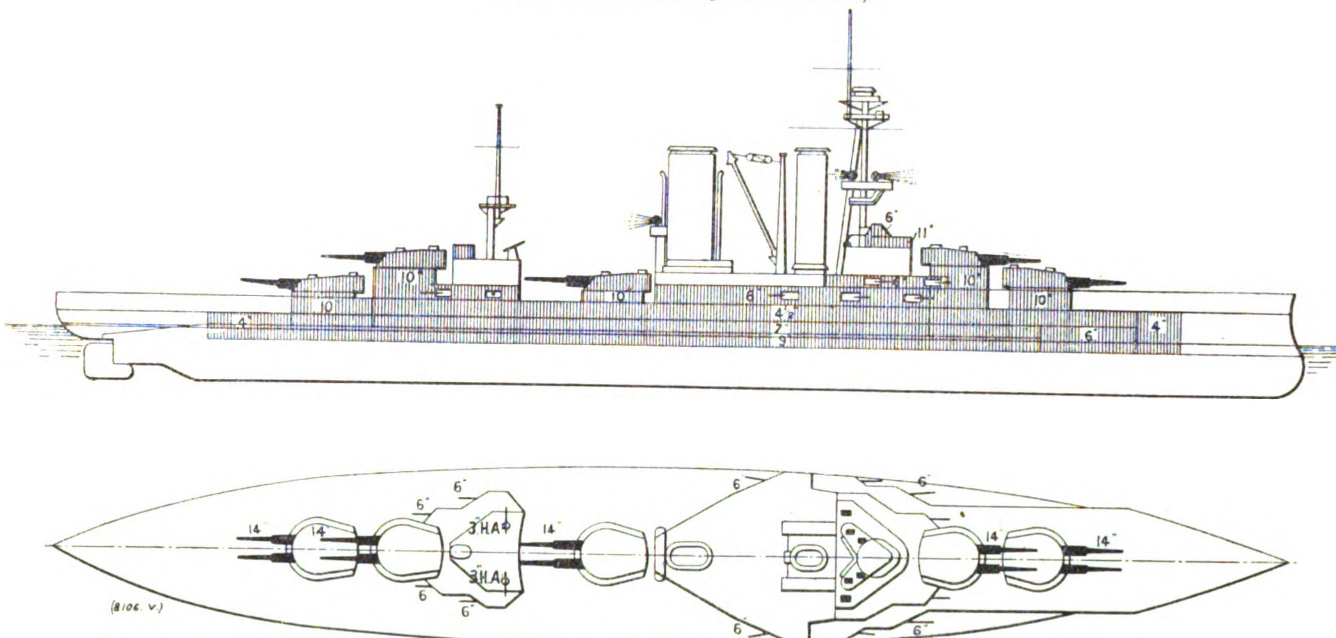


Length (extreme), 545¾ ft.; 6,495 tons; Speed, 32 knots. Completed 1931.
Armament, 6—7·5-in.; 12—4-in. A.A.; 6 Pom Poms; 6 21-in. torpedo tubes.
1 catapult; 2 seaplanes.

CHILE.

BATTLESHIP.

Almirante Latorre (*formerly* H.M.S. Canada).



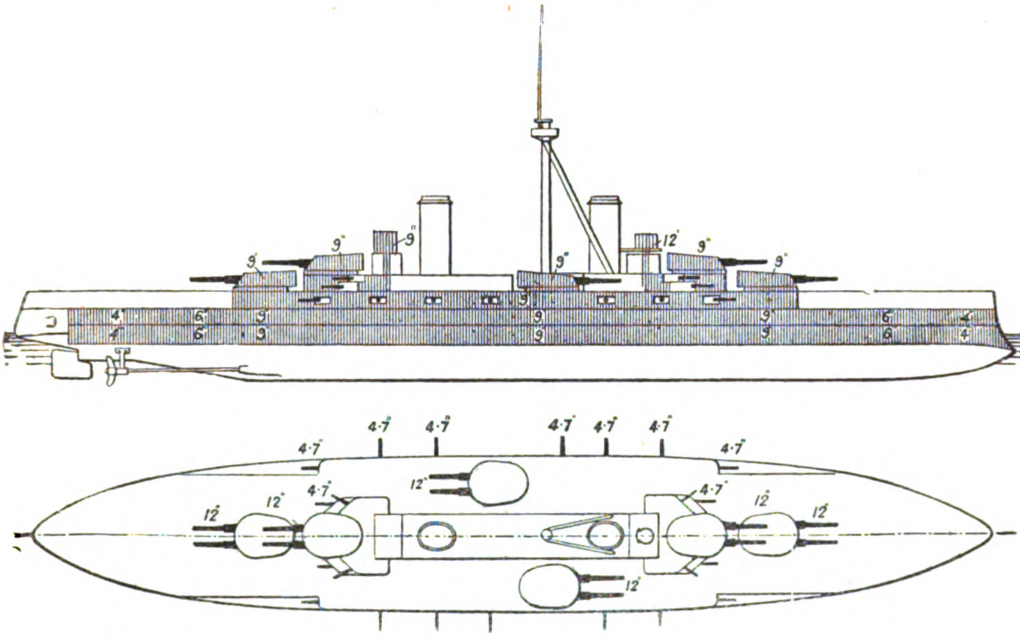
Length (extreme), 661 ft. ; Length B.P., 625 ft. ; 33,200 tons ; Speed, 23 knots ; Completed, 1915 ; Modernised at Devonport Dockyard 1929–31.*
Armament, 10—14-in. ; 14—6-in. ; 2—3-in. A.A. ; 4—3-pr. ; 4 submerged 21-in. torpedo tubes.

* During modernisation maintopmast has been raised and bridge platforms extended.

BRAZIL.

BATTLESHIPS.

Minas Geraes. **São Paulo.**

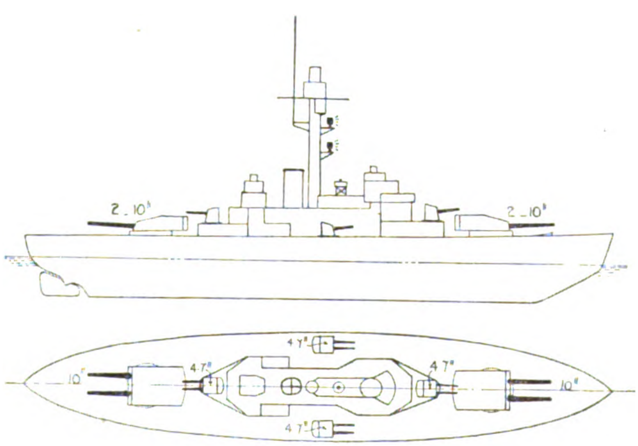


Length (extreme), 543 ft.; Length B.P., 500 ft.; 19,200 tons; Speed, 21 knots; Completed, 1909, 1910.
Armament, 12—12-in.; 12—4·7-in.; 6—3-pr.; 2—3-in A.A.; 4 M.
Overhauled and refitted at Brooklyn Navy Yard, 1921-22, and A.A. guns installed.
Correction to plan: Ten main deck 4·7-in. guns removed in 1931.

FINLAND.

ARMOURED GUNBOATS.

Väinämöinen. **Ilmarinen.**

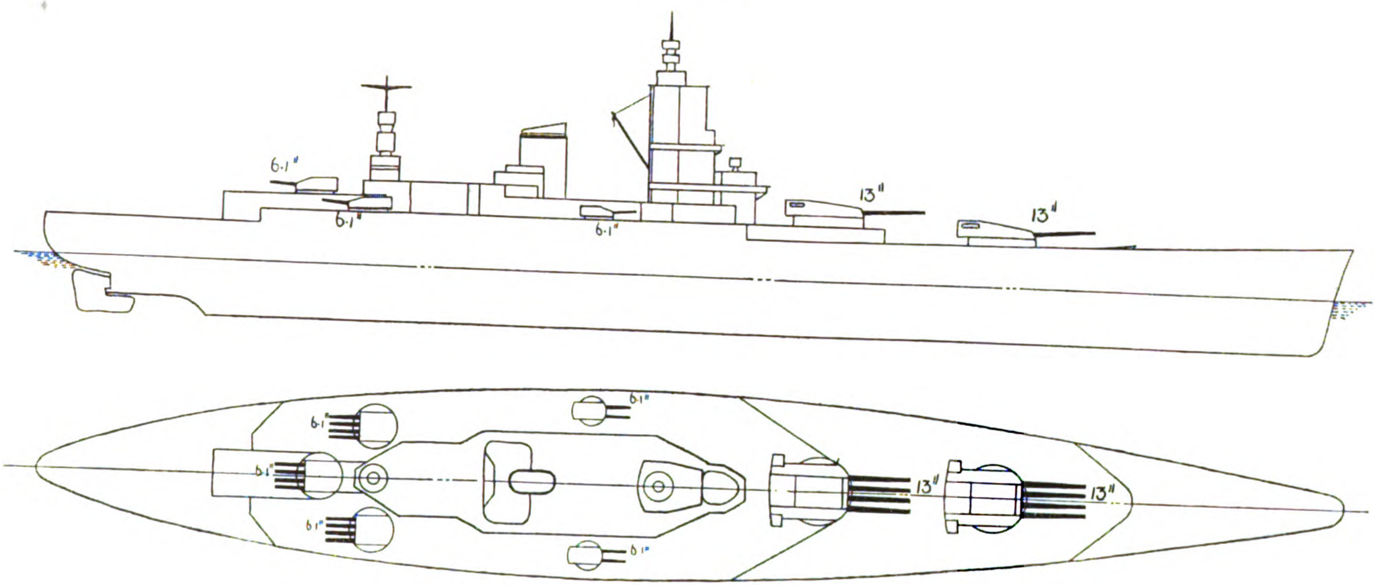


Length, 305 ft.; 4,000 tons; Speed, 15 knots.
Armament, 4—10-in.; 8—4·7-in
Completed, 1932—33.

FRANCE.

BATTLESHIP.

Dunkerque.

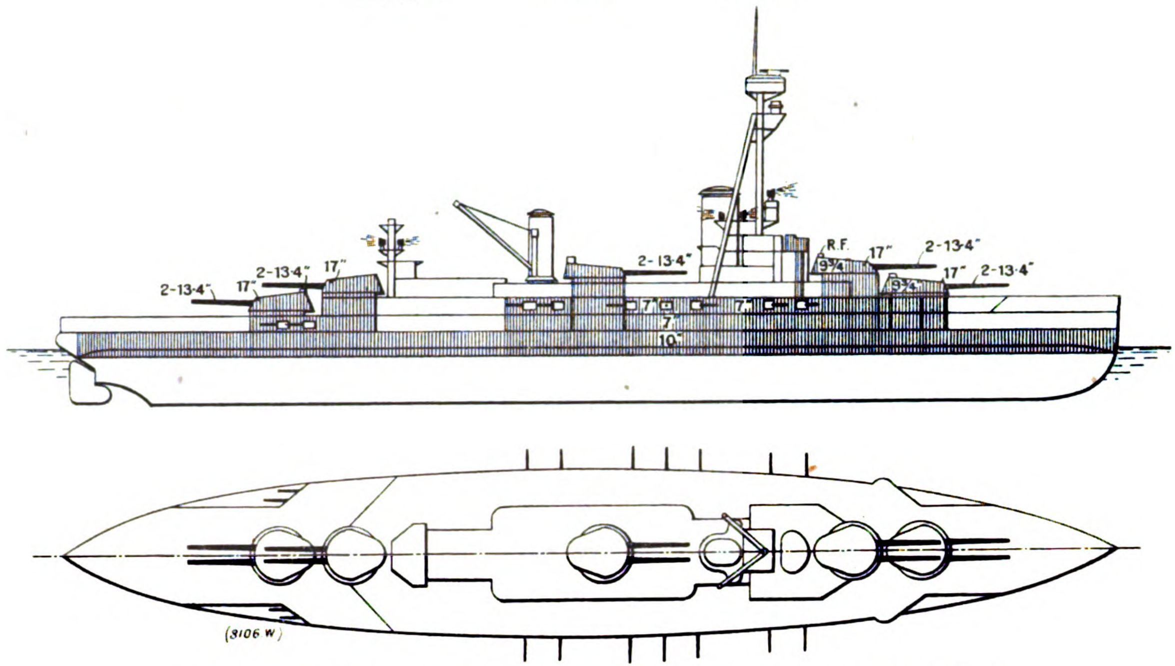


Length, 685 ft.; 26,500 tons; Speed, about 29 knots.
Armament, 8—13-in., 16—6-in., 40 smaller.
Building at Brest.

FRANCE.

BATTLESHIPS.

Bretagne. **Lorraine.** **Provence.**

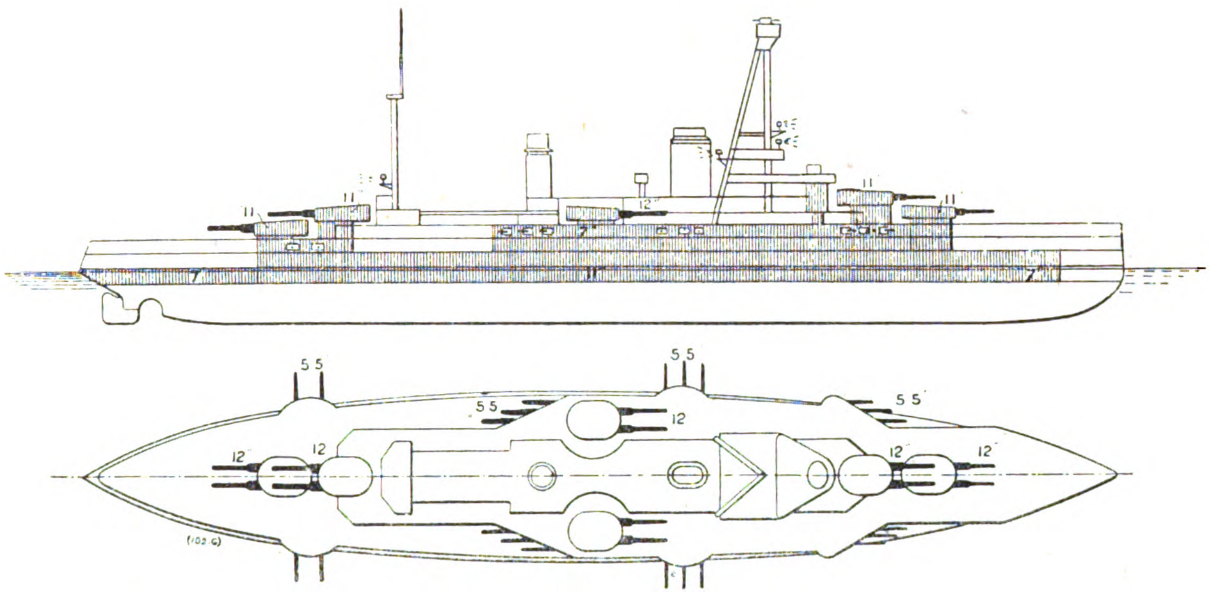


Length (extreme), 544 ft. 6 ins.; 23,128 tons; Speed, 20 knots; Completed, 1915–16; Modernised, 1925–27.
Converted to oil burning, 1931.
Armament, 10—13·4-in.; 18—5·5-in.; 4—3-in. A.A.; 4—3 pr.; 2—1-pr.; 4 submerged 18-in. torpedo tubes.
Correction to plan: The ships have now tall maintopmasts and no foretopmasts.

FRANCE.

BATTLESHIPS.

Jean Bart. Courbet. Paris.

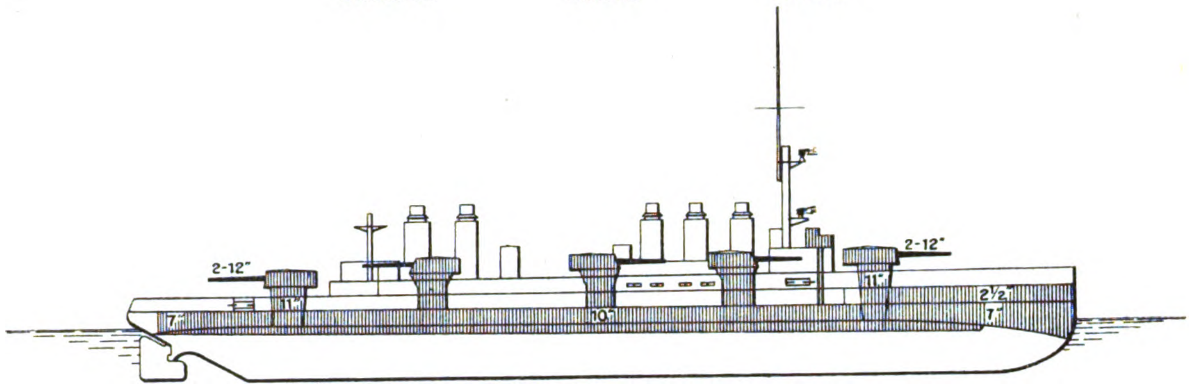


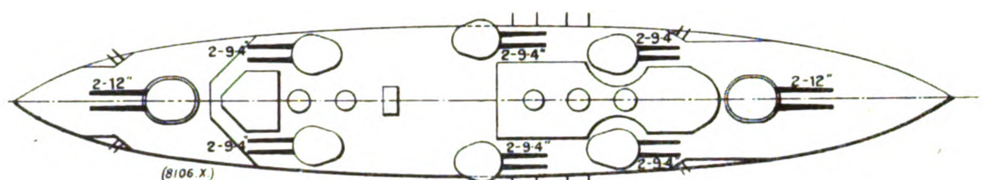
Length (extreme), 544 ft. 6 ins.; Length B.P., 541 ft. 4 ins.; 22,189 tons; Speed, 20 knots; Completed, 1913–14. Modernised in 1929. Converted to oil burning, 1931.
Armament, 12—12-in.; 22—5·5-in.; 4—3-in. A.A.; 4—3-pr. (Courbet has 3—3-pr.); 2—1-pr.; 4 submerged 18-in. torpedo tubes.

FRANCE.

BATTLESHIPS.

Condorcet. Diderot. Voltaire.





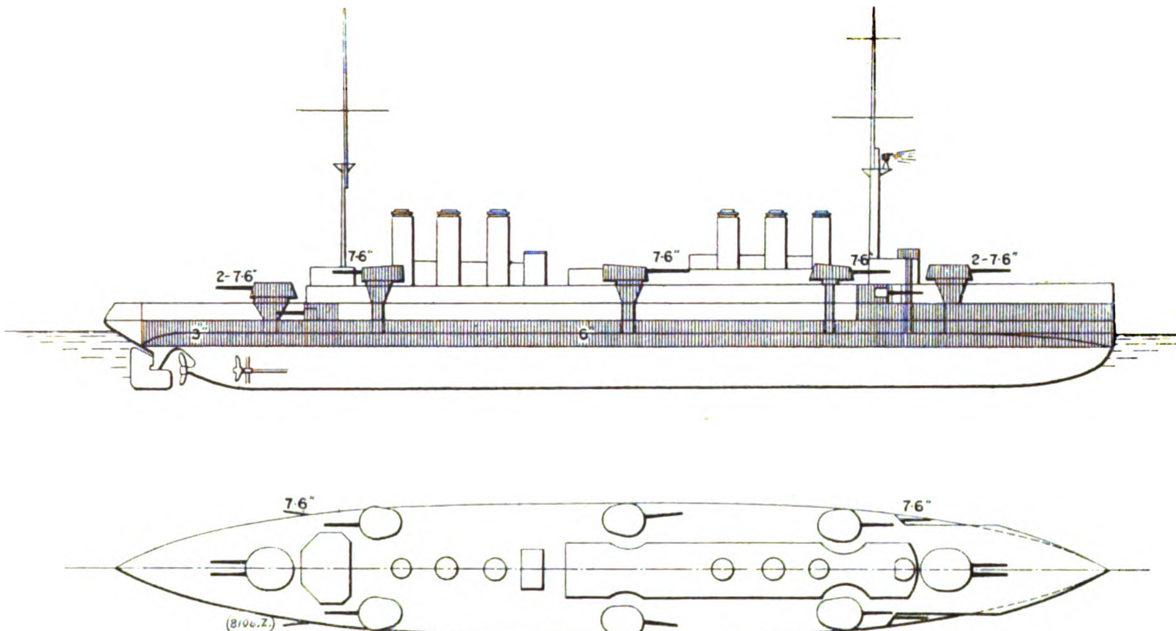
Length (extreme), 481 ft.; Length W.L., 475 ft. 9 ins.; Speed, 19¼ knots; 17,597 tons; Completed, 1911.
Armament, 4—12-in.; 12—9·4-in.; 12—3-in.; 2—3-in. A.A.; 2—3-pr. A.A. (Condorcet, 4—3-pr.); 2—1-pr.; 2 L.; 2 submerged 18-in. torpedo tubes.

Correction to plan: Diderot has tall mainmast.

FRANCE.

ARMOURED CRUISER

Waldeck Rousseau.

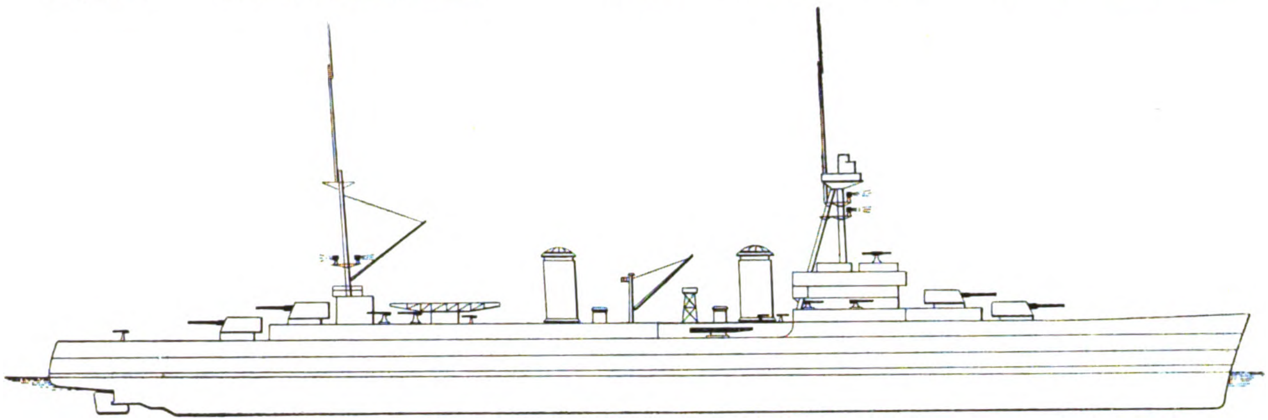


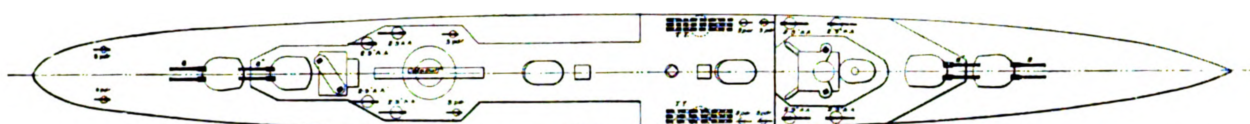
Length (extreme), 521 ft. 4 ins.; Length W.L., 515 ft.; Speed, 23 knots; 13,828 tons; Completed, 1910.
Armament, 14—7·6-in.; 10—3-in.; 10—9-pr. A.A.; 2—3 pr.; 2 M.; 2 submerged 18-in. torpedo tubes

FRANCE.

CRUISERS.

Duquesne. Tourville. ("*Duquesne*" *Class.*) **Suffren. Colbert. Foch. Dupleix.** ("*Suffren*" *Class.*)





Length (between perpendiculars), 607 ft. (Duquesne and Tourville (extreme), 626 ft. 8 in.); 10,000 tons; Speed, 32 knots (Duquesne and Tourville, 33·2 knots).

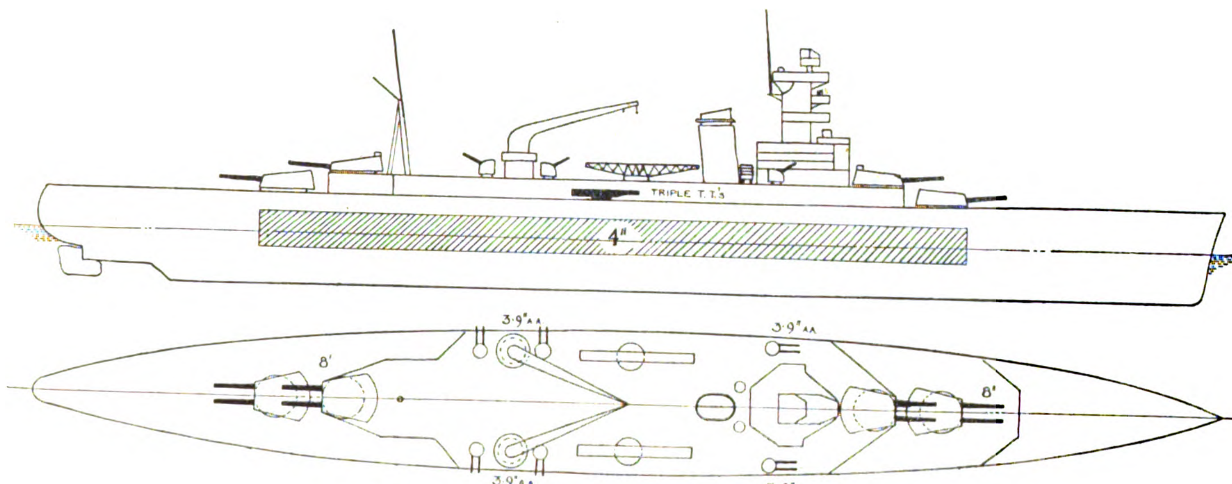
Armament, 8—8-in., 8—3-in. A.A. (Dupleix, Colbert and Foch have 8—3·5-in. A.A.); 8—1-pr.; 2—triple 21-in. T.T.'s.

The above plan is for Duquesne and Tourville The others differ slightly from this in details of bridges, cranes, catapults, etc. **Suffren has 2 catapults in the position shown above.** Colbert, Dupleix and Foch have tripod mainmasts, 2 catapults between the funnels and **the two cranes abreast the after funnel.**

FRANCE.

CRUISER.

Algérie.



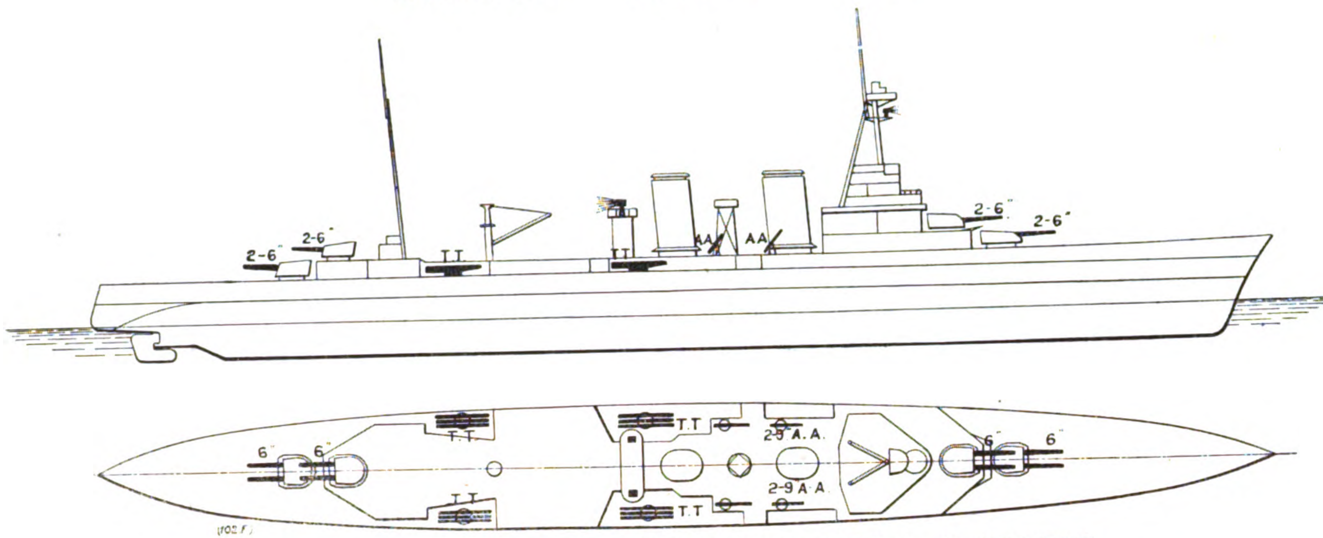
Length (between perpendiculars), 607 ft.; 10,000 tons; Speed, 31 knots.
Armament, 8—8-in.; 12—3·9-in. A.A.; 8—1·5-in.; 16 M.
2 catapults; 2 seaplanes.
Building at Brest.

FRANCE.

CRUISERS.

"Duguay-Trouin" Class.

La Motte Picquet. **Duguay-Trouin.** **Primauguet.**



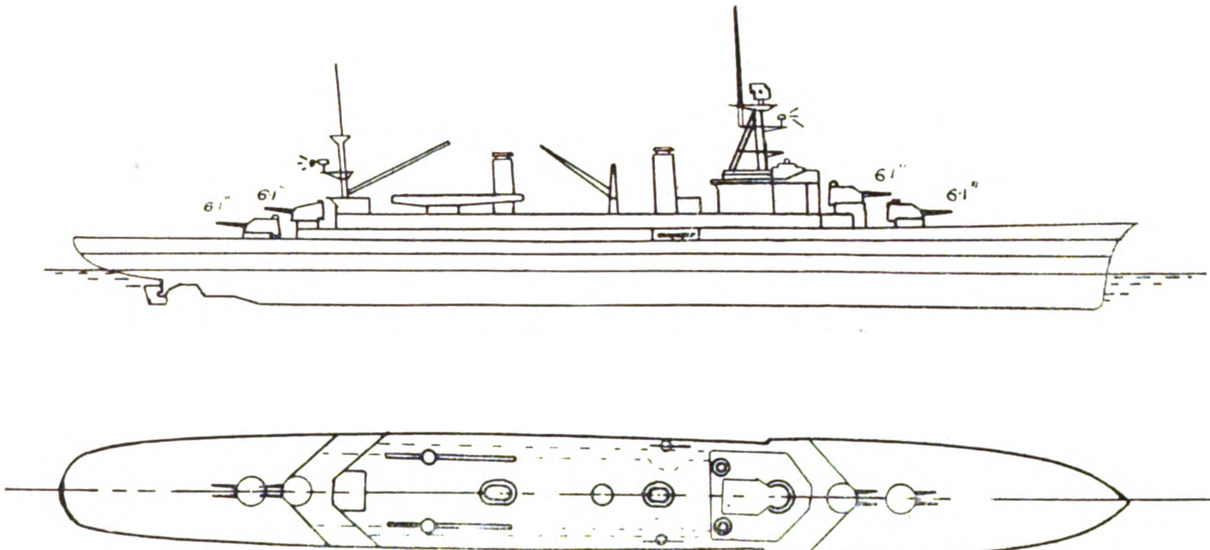
Length (extreme), 594 ft. 10 ins.; Length B.P., 575 ft.; 7,249 tons; Speed, 33 knots. Completed, 1926–27.
Armament, 8—6·1-in.; 4—3-in. A.A.; 2—3-pr.; 2 M.; 1 L.; 4 triple torpedo tubes (21·7-in. torpedoes); catapult; 2 seaplanes.

NOTE.—Reported to have protection to magazines.

FRANCE.

TRAINING CRUISER.

Jeanne d'Arc.



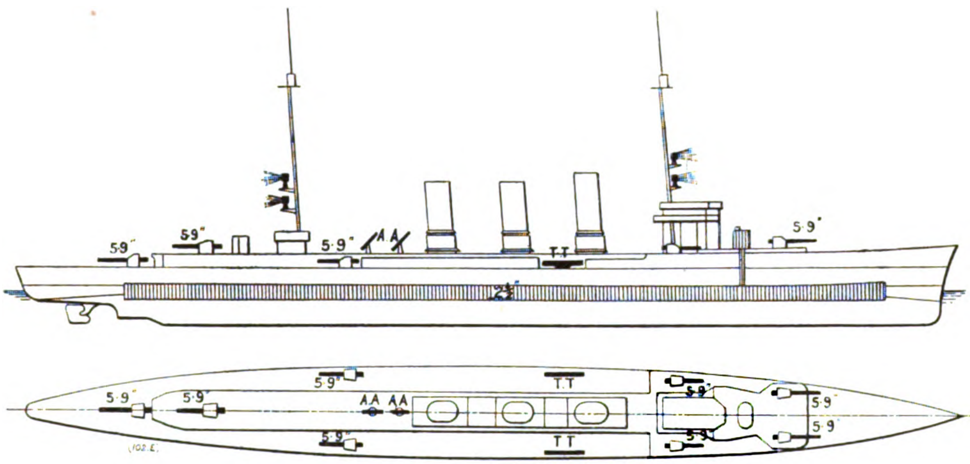
Length (extreme), 557 ft. 8 ins.; 6,496 tons; Speed, 26 knots; Completed 1931.
Armament, 8—6·1-in.; 4—3-in. A.A.; 2—1·6-in.; 2 M.; 2—21·7-in. torpedo tubes.
2 seaplanes.

Correction to plan: The catapults have been removed.

FRANCE.

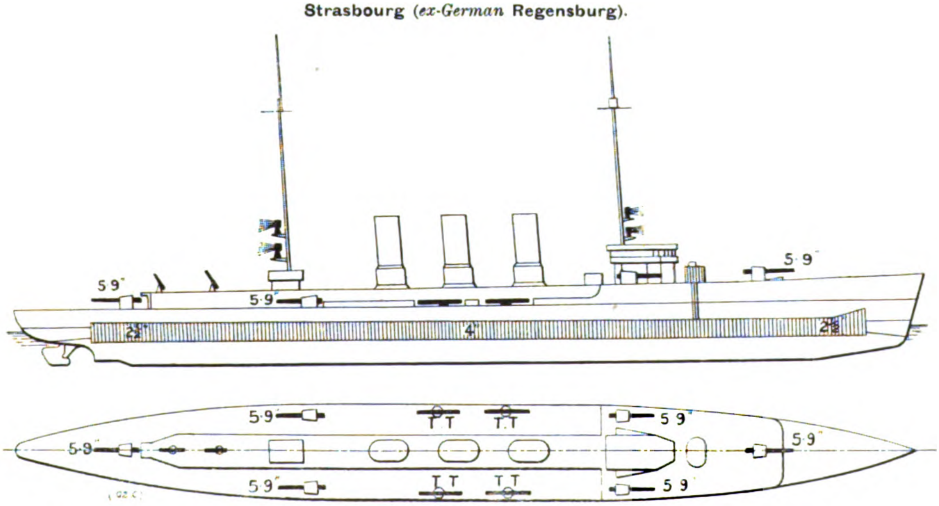
LIGHT CRUISERS.

Metz (*ex-German* Königsberg).



Length (extreme), 497 ft. ; 5,264 tons ; Speed, 27 knots ; **Completed, 1916.**
Armament, 8—5·9-in. ; 2—3-in. A.A. ; 4 M. ; 4 torpedo tubes (2 above water, 2 submerged).

Strasbourg (*ex-German* Regensburg).



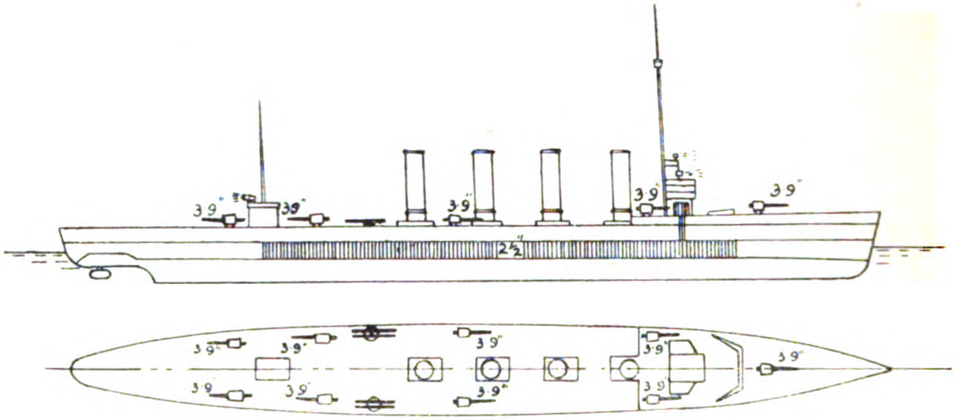
Length (extreme), 468 ft. ; Length (water-line), 456 ft. ; 4,723 tons ; Speed, 26 knots ; Completed, 1914.
Armament, 7—5·9-in. ; 1—3-in. A.A. ; 4 M. ; 120 mines ; 4 torpedo tubes (19·7-in. torpedoes).

Correction to plan : A 5·9-in. gun is now fitted at the after end of the superstructure instead of the two small guns shown.

FRANCE.

LIGHT CRUISER.

Thionville (*ex-Austrian* Novara).

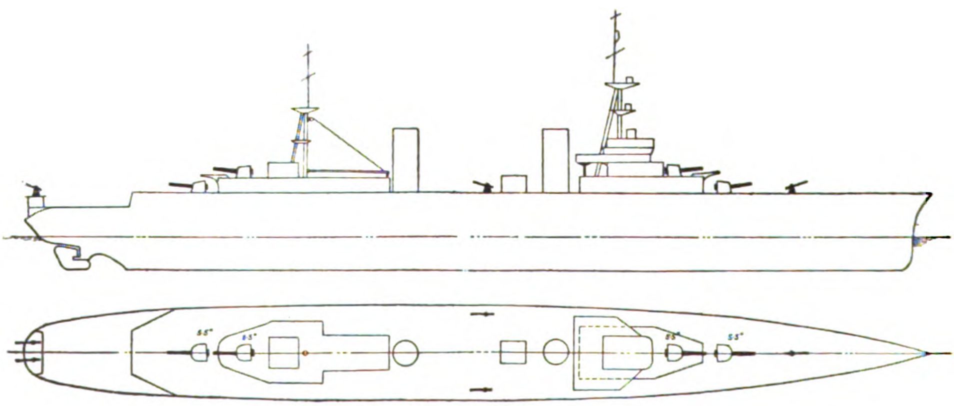


Length (extreme), 428 ft. 7 ins. ; 2,922 tons ; Speed, 27 knots.
Armament, 9—3·9-in. ; 2—3-in. A.A. ; 2 twin above-water torpedo tubes.
Correction to plan : The torpedo tubes are fitted right aft.

FRANCE.

CRUISER MINELAYER.

Pluton.

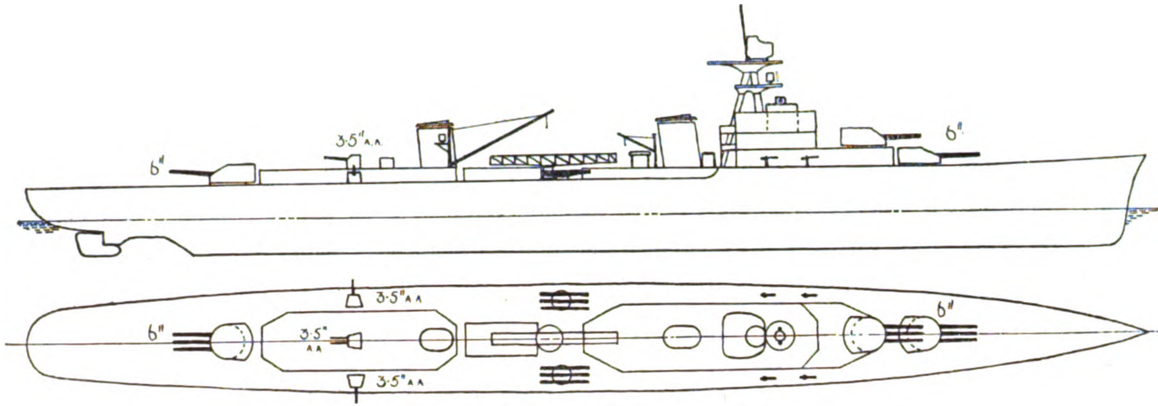


Length (between perpendiculars), 472 ft. ; 4,773 tons ; Speed, 30 knots ; Completed, 1931.
Armament : 4—5·5-in., 10—1-pdr. ; 12 M. ; 1,000 mines.

FRANCE.

CRUISER MINELAYER.

Emilé Bertin.



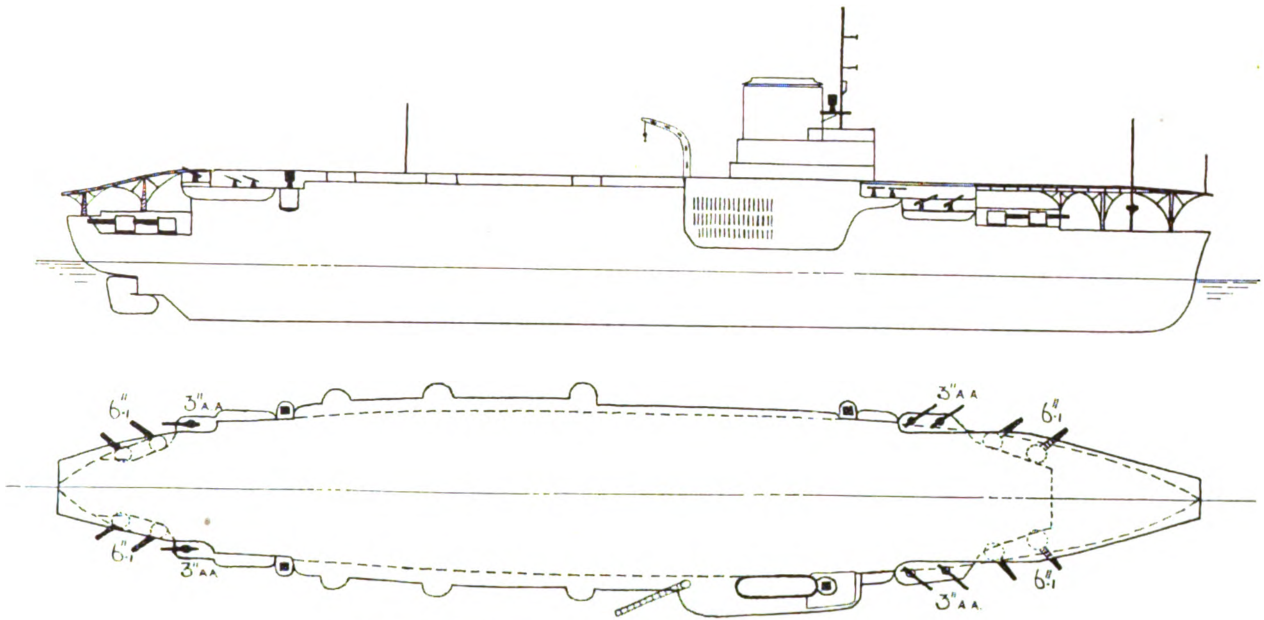
Length (extreme), 580 ft. ; 5,886 tons ; Speed, 34 knots.
Armament, 9—6-in. ; 4—3·5-in. A.A. ; 8—1-pr. ; 250 mines.
1 catapult ; 1 aircraft.

Building at Penhoet, St. Nazaire.

FRANCE.

AIRCRAFT CARRIER.

Béarn.

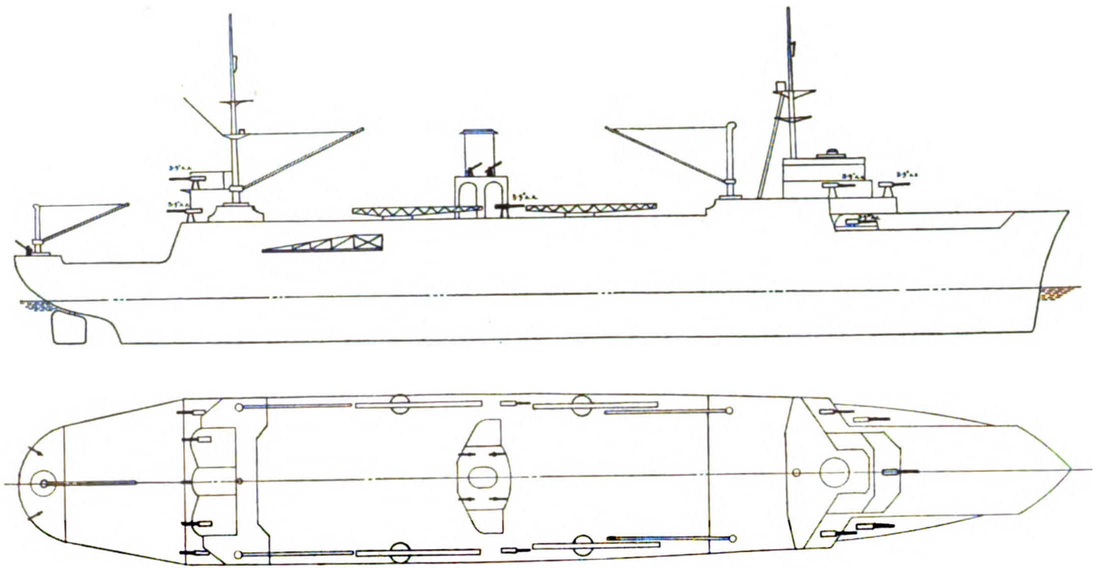


Length (extreme), 597 ft. ; 22,146 tons ; Speed, 21·5 knots ; Completed, 1928.
Armament, 8—6·1-in. ; 6—3-in. A.A. ; 8—1-pr. A.A. ; 12 M. A.A. ; 4—21·7-in. torpedo tubes ; 41 planes.

FRANCE.

AVIATION TRANSPORT.

Commandant Teste.



Length (extreme), 548 ft.; 10,000 tons; Speed, 20½ knots; Completed, 1932.

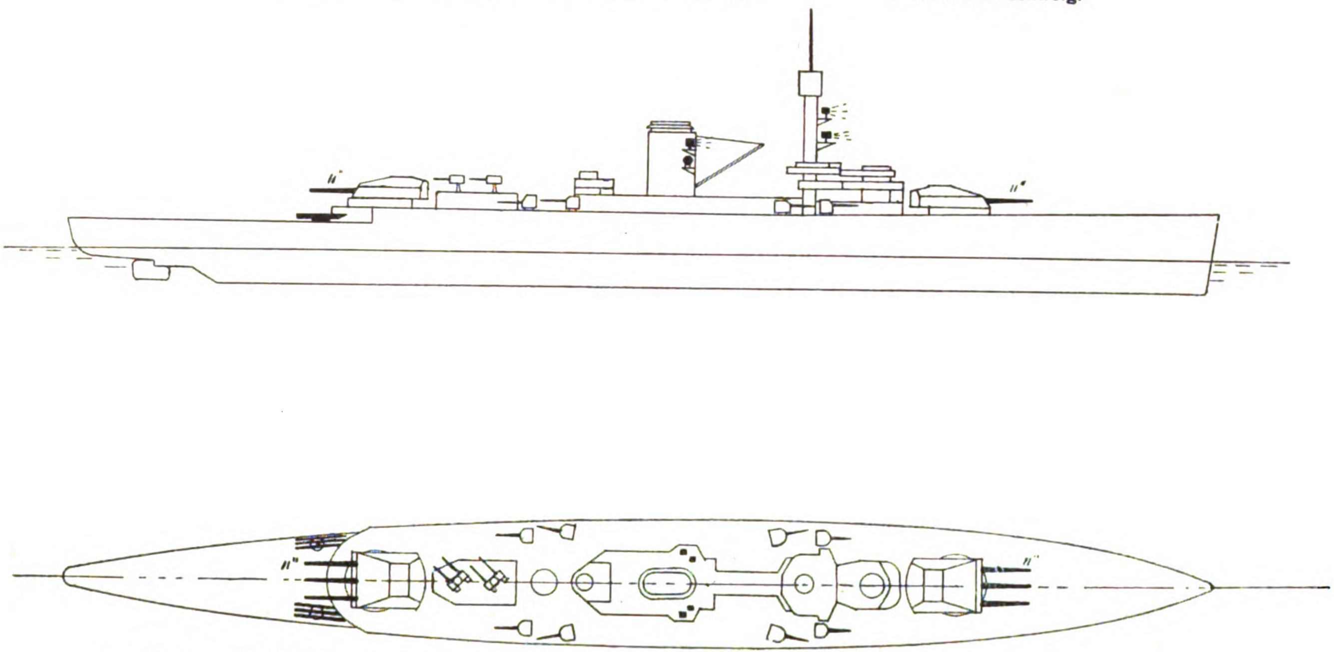
Armament, 12—3·9-in. A.A.; 8—3-pdr. A.A.; 12 M.; 20 planes.

GERMANY.

ARMOURED SHIPS.

Deutschland (*formerly known as* Ersatz Preussen).

Admiral Scheer (*formerly known as* Ersatz Lothringen). Ersatz Braunschweig.

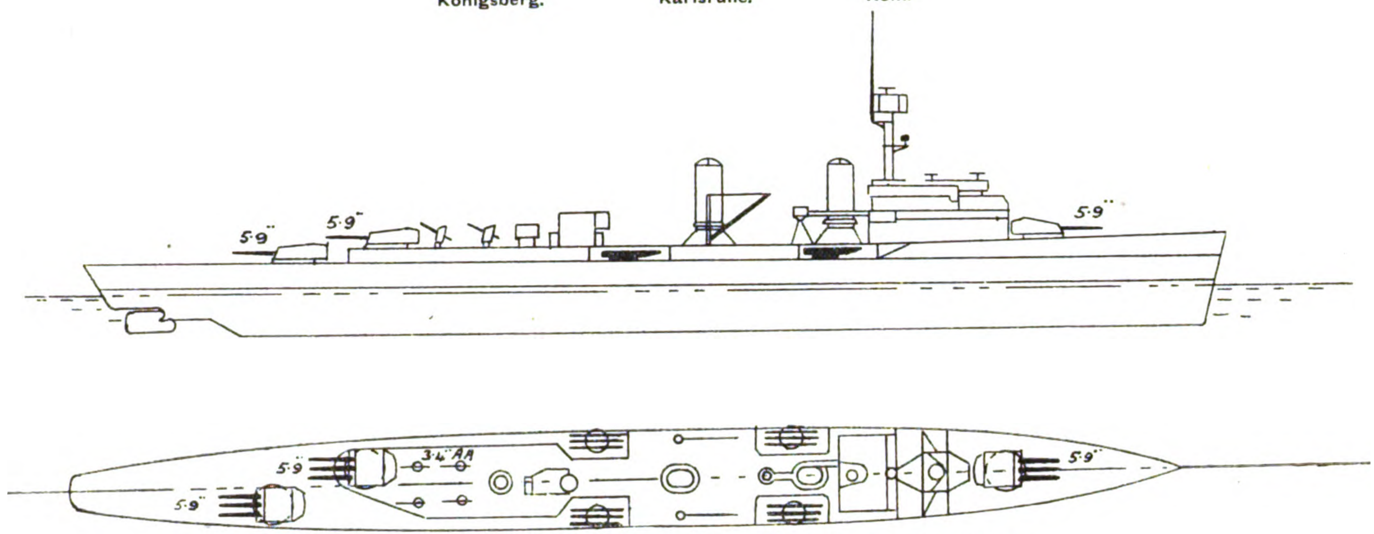


Length (extreme), 609 ft. ; Standard Displacement, 10,000 tons ; Speed, 26 knots. Deutschland completed, 1933. The others are building.
Armament, 6—11-in. ; 8—5·9-in. ; 4—3.4-in. A.A. ; 6 torpedo tubes.

GERMANY.

LIGHT CRUISERS.

Königsberg. Karlsruhe. Köln.

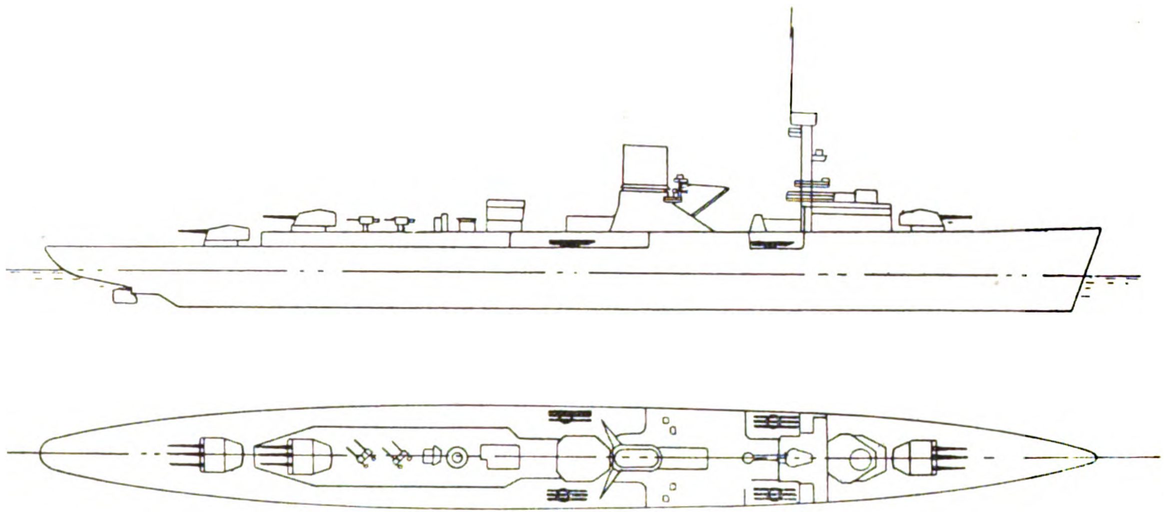


Length (extreme), 570 ft. 10 ins. ; 6,000 tons ; Speed, 32 knots ; Completed, 1929–30.
Armament, 9—5·9-in. ; 4—3·4-in. A.A. ; 4 triple 19·7-in. torpedo tubes.

GERMANY.

LIGHT CRUISER.

Leipzig.

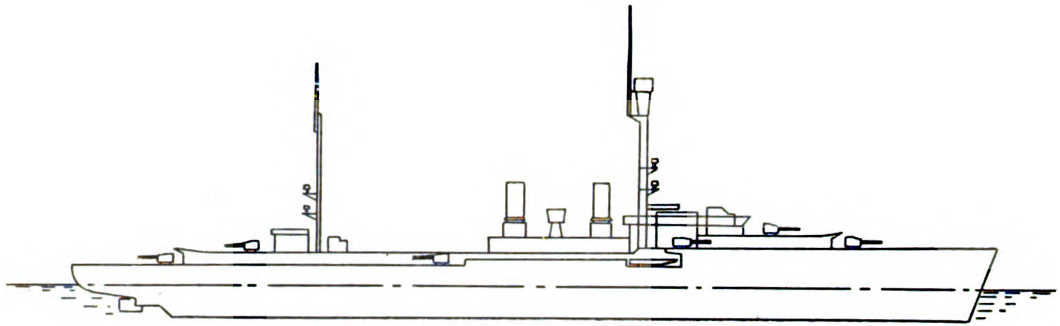


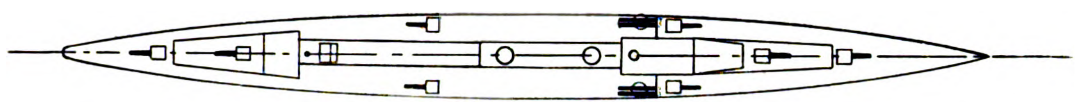
Length W.L., 543 ft. 10 ins.; 6,000 tons; Speed, 32 knots; Completed, 1931.
Armament, 9—5·9 in.; 4—3·4 in. A.A.; 4 triple 19·7-in. torpedo tubes.

GERMANY.

LIGHT CRUISER.

Emden.





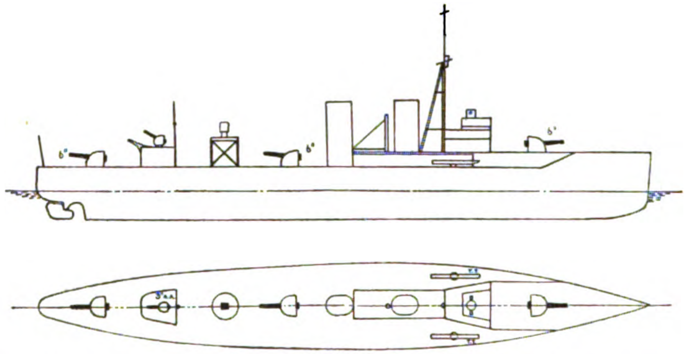
Length (extreme), 510 ft. 2 ins.; 6,000 tons; Speed, 29 knots; Completed, 1925.
Armament, 8—5·9-in.; 2—3·4-in. A.A.; 4—19·7-in. torpedo tubes in twin mountings.
The 8—5·9-in. guns will be mounted in twin mountings, 2 forward and 2 aft, when the mountings are ready.

Correction to plan: The forward funnel is higher than the after one.

GREECE.

CRUISER

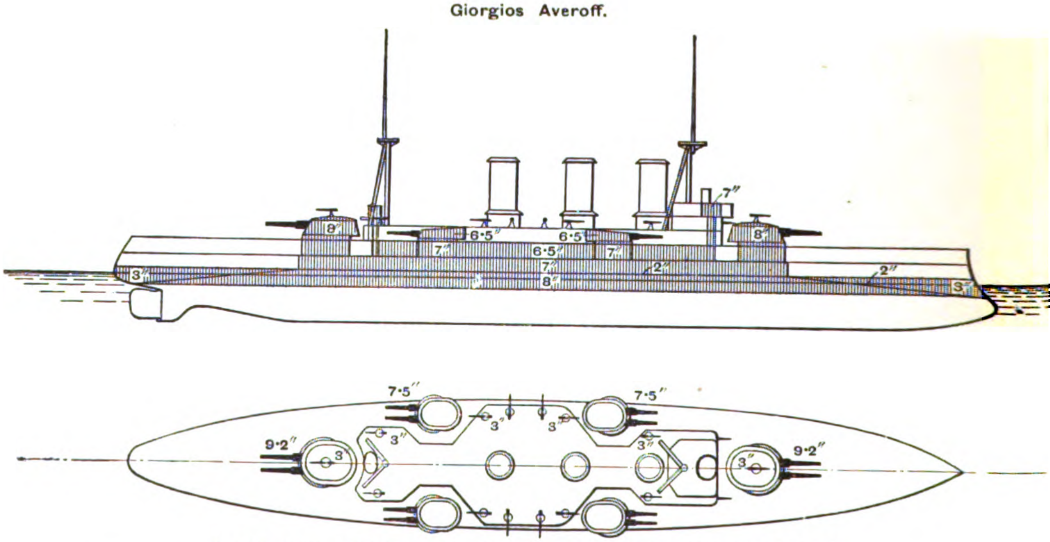
Helle.



Length, 322 ft. ; 2,083 tons ; Speed, 20 knots ; Completed, 1914 ; Reconstructed, 1929.
Armament, 3—6-in.; 1—3-in. A.A. ; 110 mines ; 2—18-in. torpedo tubes.

ARMOURED CRUISER.

Giorgios Averoff.

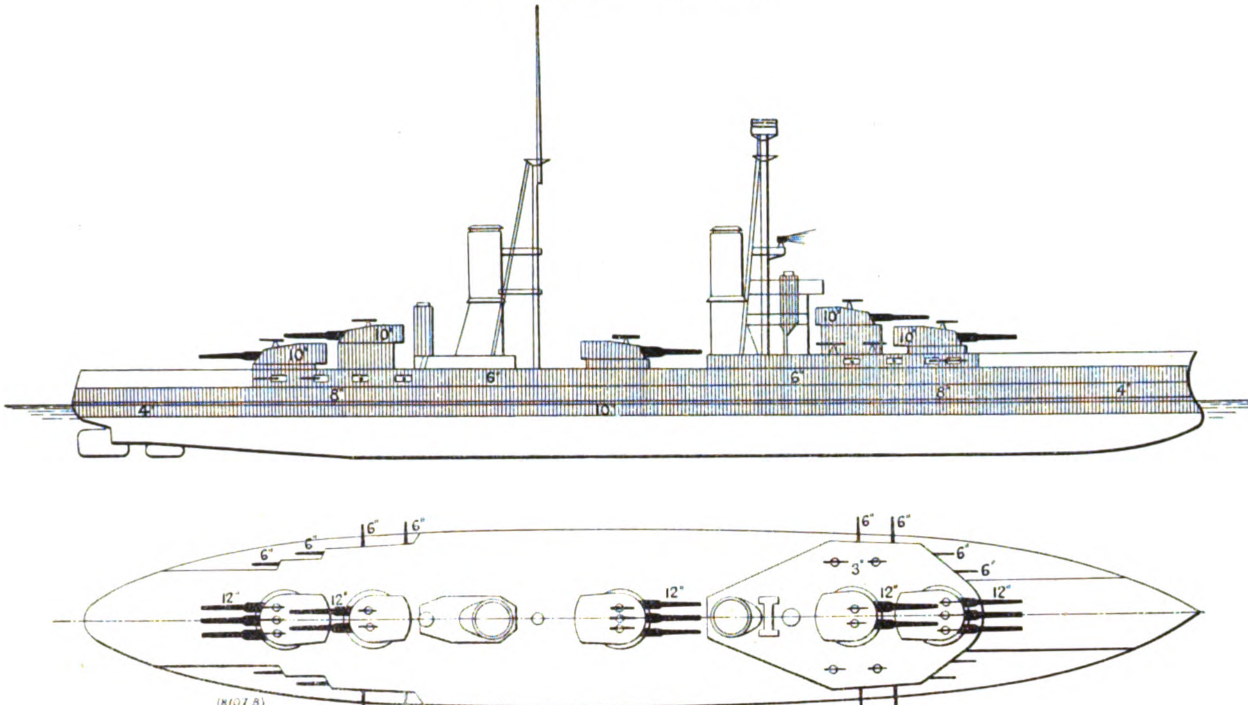


Length, 462 ft. ; 9,301 tons ; Speed, 24 knots ; Completed, 1911. Refitted, 1927.
Armament, 4—9·2-in. ; 8—7·5-in. ; 16—3-in. ; 2—3-in. A.A. ; 4—3-pr. ; 2 M. ; 3 submerged 18-in. torpedo tubes.

ITALY.

BATTLESHIPS.

Andrea Doria. **Caio Duilio.**



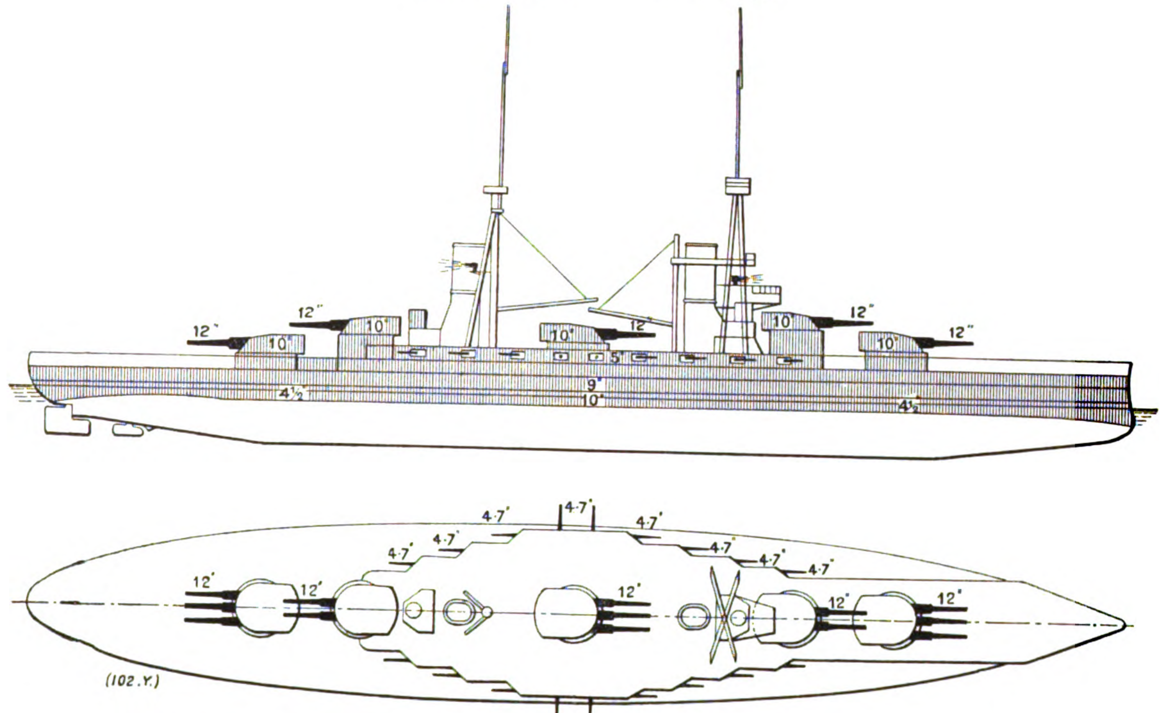
Length (extreme), 575 ft. 9 ins.; Length B.P., 554 ft. 4 ins.; Speed, 22 knots; Completed, 1915.

Armament, 13—12-in.; 16—6-in.; 13—3-in. (3 of these are temporarily removed); 6—3-in. A.A.; 2—2-pr.; 6 M.; 4 L.; 2—18-in. torpedo tubes.

ITALY.

BATTLESHIPS.

Conte di Cavour. Giulio Cesare



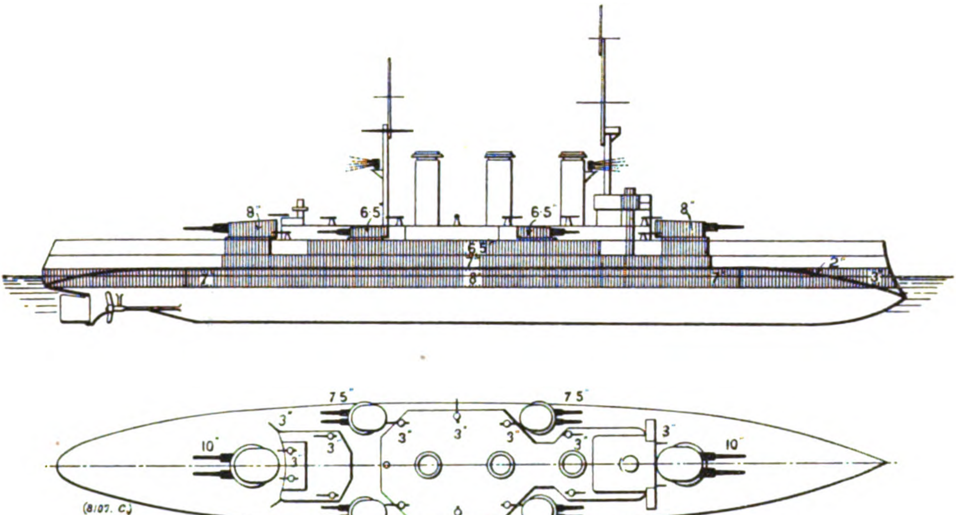
(102.Y.)

Length (extreme), 575 ft. 9 ins. ; Length B.P., 554 ft. 4 ins. ; Speed, 22 knots ; 22,144 tons ; Completed, 1914-1915.
Armament, 13—12-in. ; 18—4·7-in. ; 13—3-in. (3 of these are temporarily removed) ; 6—3-in. A.A. ; 2—2-pr. ; 2 M. ; 4 L.
A fixed catapult is mounted on port side of Forecastle Deck forward.

ITALY.

ARMOURED CRUISER.*

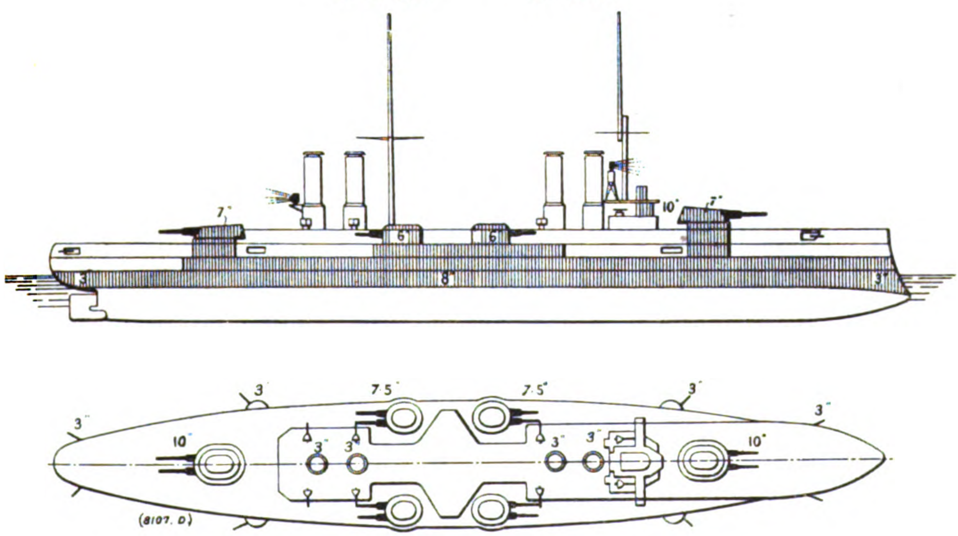
Pisa.



Length (extreme), 460 ft. 11 ins. ; Length B.P., 426 ft. 6 ins. ; Speed, $22\frac{1}{2}$ knots ; 8,759 tons ; Completed, 1909.
Armament, 4—10-in. ; 8—7·5-in. ; 12—3-in. ; 6—3-in. A.A. ; 4 M. ; 2 L. ; 2—18-in. torpedo tubes.
Cadets' Training Ship.

ARMOURED CRUISERS *

S. Giorgio. S. Marco.



Length (extreme), 462 ft. 2 ins. ; Length B.P., 429 ft. 10 ins. ;
Speed, 22·5 and 23 knots ; 9,232 and 9,350 tons ; Completed, 1910 and 1911.
Armament, 4—10-in. ; 8—7·5-in. ; 10—3-in. ; 6—3-in. A.A. ; 2—3-pr. ; 6 M. ; 2 L. ; 2—18-in. torpedo tubes.

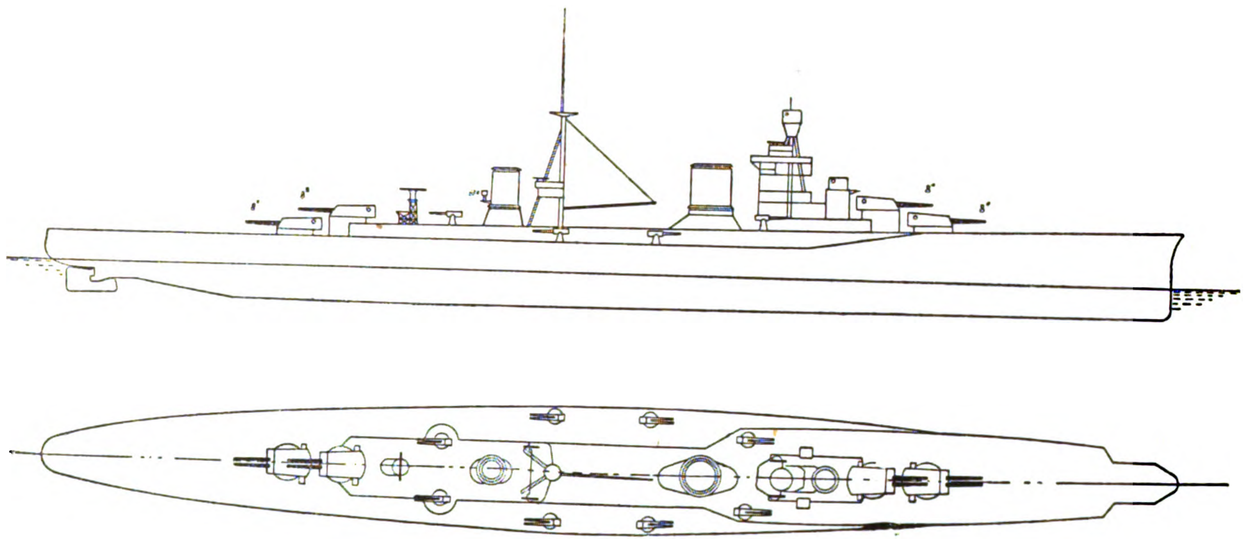
* Classified as Battleships, 2nd class, in Italian official tests.

ITALY.

CRUISER.

Modified "Trento" Class.

Bolzano.



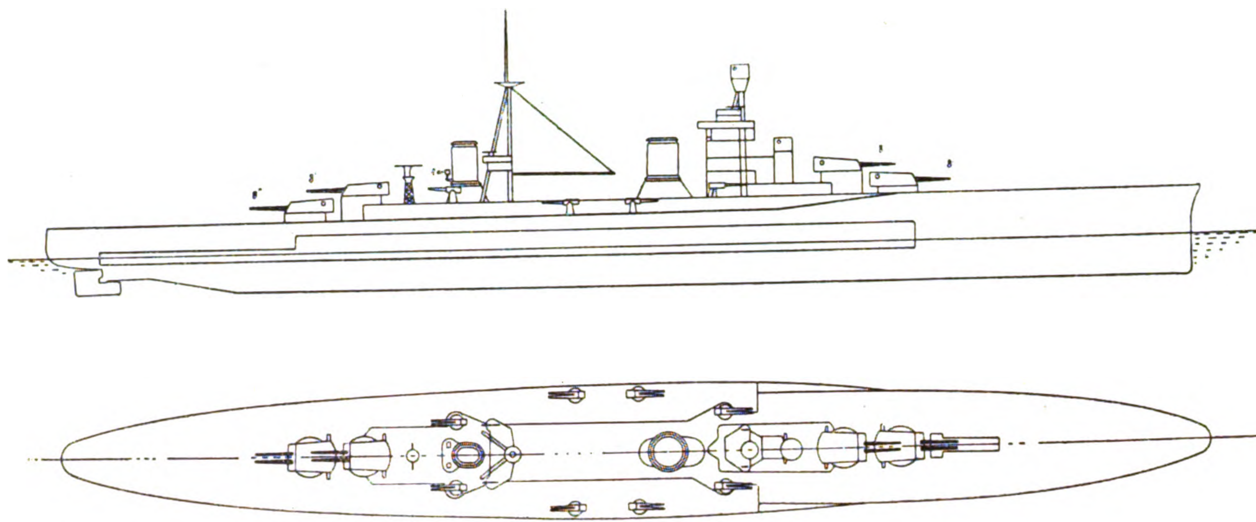
Length B.P., 644 ft.; 10,000 tons; Completed, 1932.
Armament, 8—8-ins ; 16—3·9-in. A.A.; 12 smaller; 2 catapults.
8—21-in. torpedo tubes may be fitted.

ITALY.

CRUISERS.

"Zara" Class.

Pola. Zara. Fiume. Gorizia.

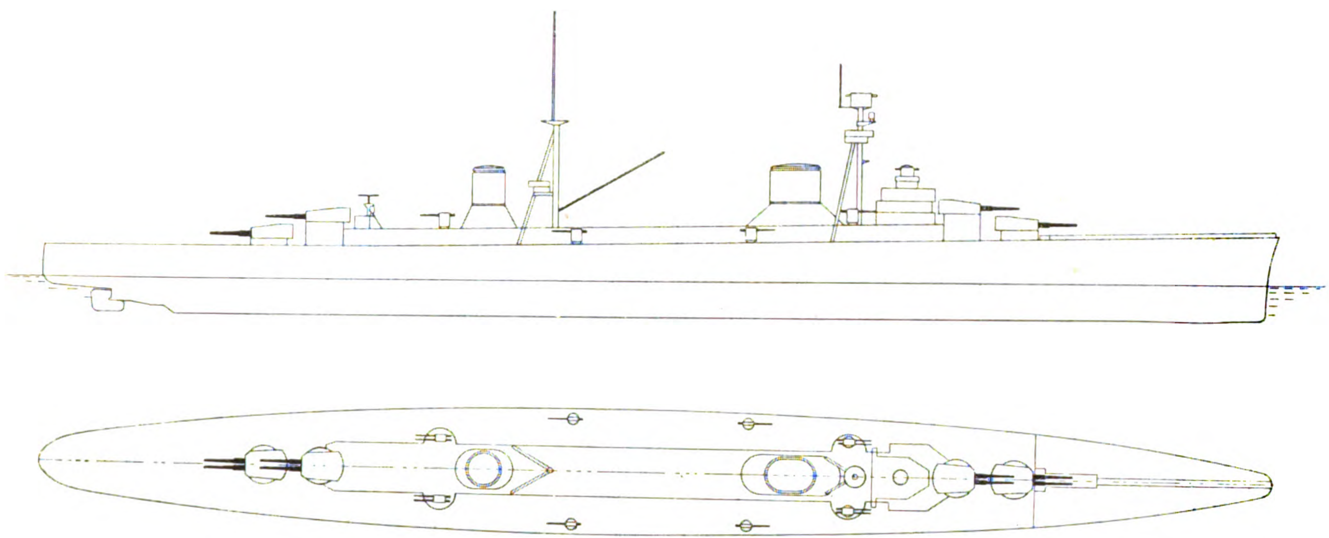


Length: Zara and Fiume, 599 ft. 5 ins.; Pola, 600 ft.; Gorizia, 590 ft. 9 ins.; 10,000 tons; Speed, 32 knots.
Armament, 8—8-in.; 16—3·9-in.; 12 smaller.
1 catapult; 2 aircraft.

ITALY.

CRUISERS.

"Trento" Class.



Length (extreme), 640 ft. 9 ins.; 10,000 tons; Speed, 35 knots; Completed, 1929.
Armament, 8—8-in.; 16—4-in.; 6 smaller; 4 twin torpedo tubes.
1 catapult; 2 aircraft.

Correction to plan: The 4-in. guns between the funnels are twin guns.

ITALY.

CRUISERS.

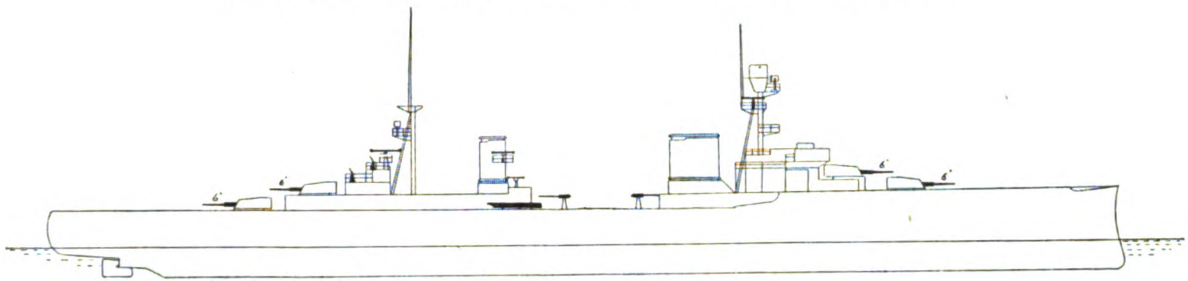
"Condottieri" Class.

NOTE.—The Montecuccoli and Muzio Attendolo (building) are also of this class, but the arrangements may differ from those shown in the plan.

Armando Diaz.*
Luigi Cadorna.*

Alberto di Guissano.
Alberico di Barbiano.

Bartolomeo Colleoni.
Giovanni della Bande Nere.



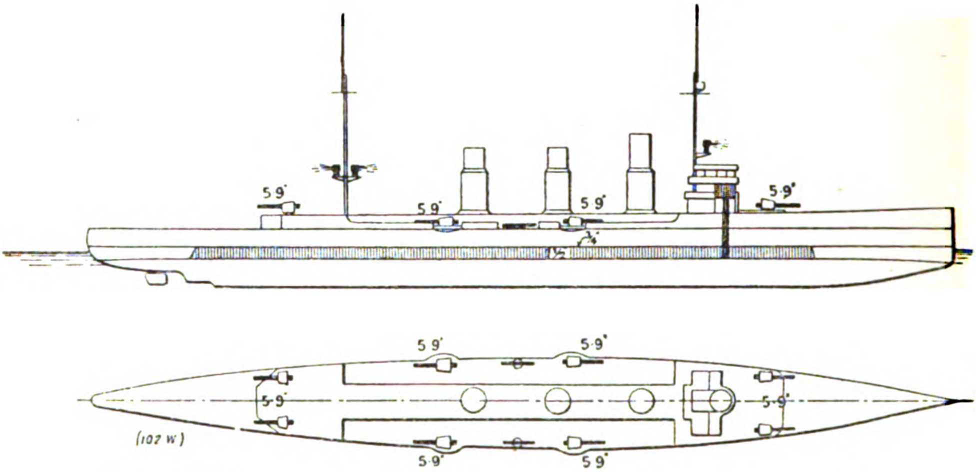
Length (extreme), 555 ft.; 5,069 tons (*559 ft., 5,009 tons); Speed, 37 knots; Completed, 1931–33.
Armament, 8—6-in.; 6—3·9-in. A.A.; and smaller guns; 4 torpedo tubes.
1 catapult and 2 seaplanes.

Corrections to plan: The bridge and foremast have been modified. The after twin 3·9-in. A.A. gun is at the superstructure level on a raised platform.
* In the Armando Diaz and Luigi Cadorna the mainmast is forward of the after funnel, the torpedo tubes are abreast the forward funnel, and the positions of the twin A.A. guns are reversed, the foremost gun being at forecastle deck level and the two after guns at upper deck level.

ITALY.

LIGHT CRUISER.

Bari (*ex-German* **Pillau**).

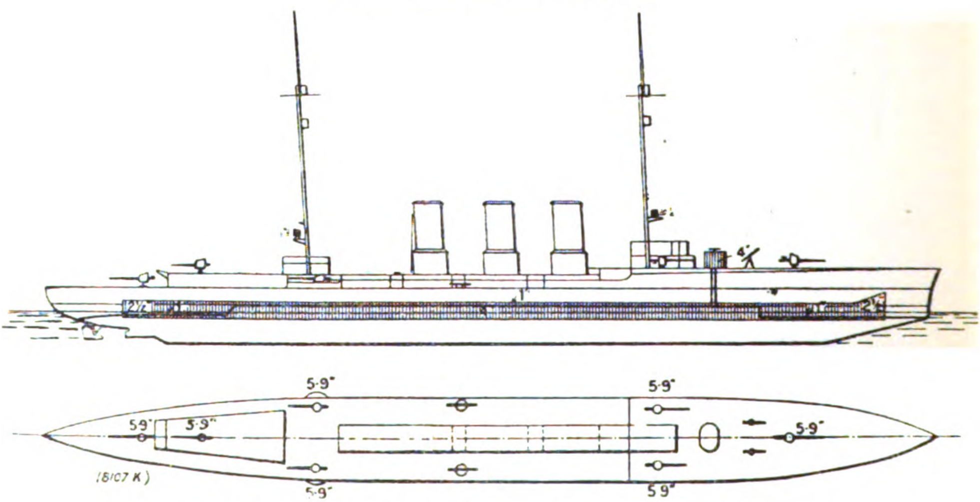


Length (extreme), 441 ft. ; Length B.P., 403 ft. ; 3,248 tons ; Speed, 27·5 knots ; Completed, 1914.
Armament, 8—5·9-in. ; 3—3-in. A.A. ; 2 above-water torpedo tubes (19·7-in. torpedoes) ; 120 mines.

ITALY.

LIGHT CRUISER.

Ancona (*formerly German* **Graudenz**).

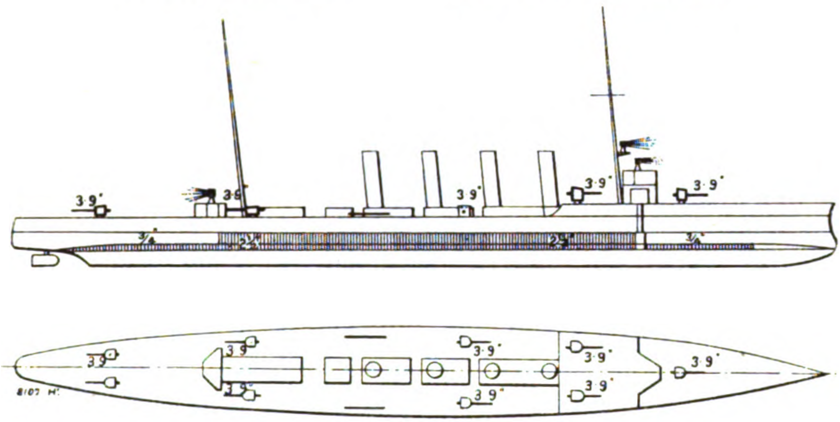


Length (extreme), 456 ft. ; Speed, $27\frac{1}{2}$ knots ; 3,838 tons ; Completed, 1914.
Armament, 7—5·9-in. ; 3—3-in. A.A. ; 2 above-water 19·7-in. torpedo tubes ; 120 mines.

ITALY.

LIGHT CRUISERS.*

Venezia (*ex-Austrian* **Saida**). **Brindisi** (*ex-Austrian* **Helgoland**).

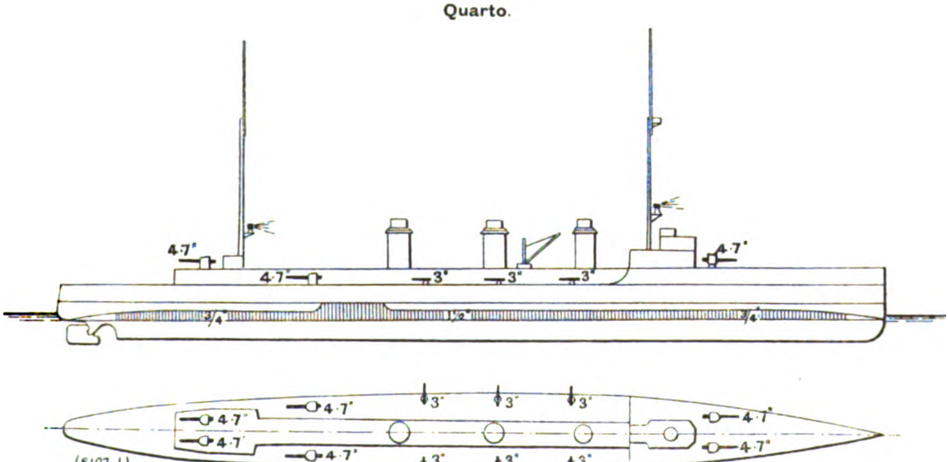


Length (extreme), 430 ft.; Length W.L., 416 ft. 9 ins.; Speed, 27 knots; 2,756 tons; Completed, 1914.
Armament, 9—3·9-in.; 1—3-in. A.A.; 170 mines; 4 torpedo tubes.

NOTE.—Thionville (*ex-Austrian* Novara), sister ship, allocated to France.

LIGHT CRUISER.*

Quarto.



Length (extreme), 431 ft. 9 ins.; Length B.P., 413 ft. 5 ins.; Speed, 28 knots; 2,903 tons; Completed, 1913.
Armament, 6—4·7-in.; 6—3-in.; 2—2-pr. A.A.; 2 above-water 18-in. torpedo tubes; 126 mines.

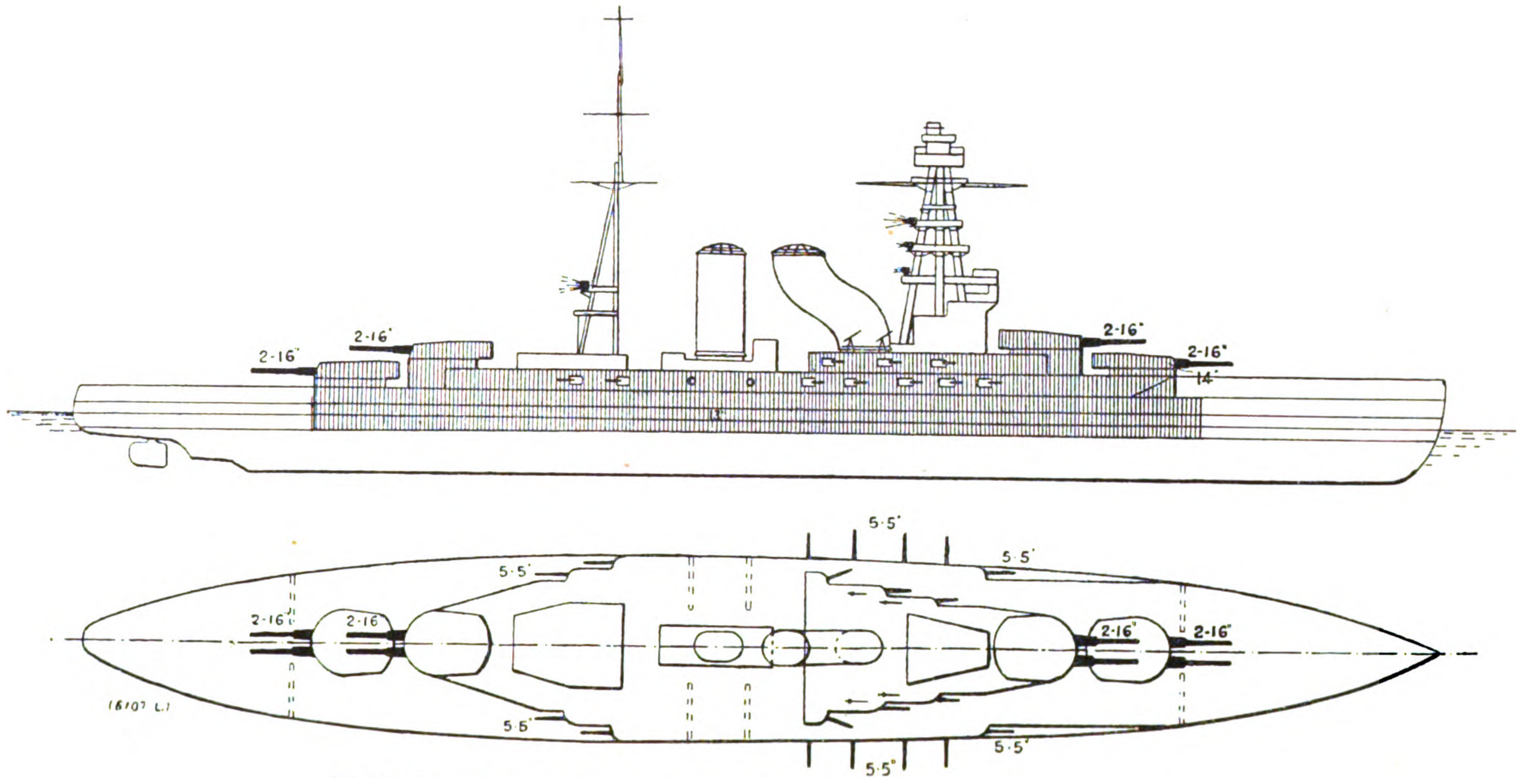
* Classified as Scouts in Italian official tests.

JAPAN.

BATTLESHIPS.

"Nagato" Class.

Nagato. **Mutsu.**



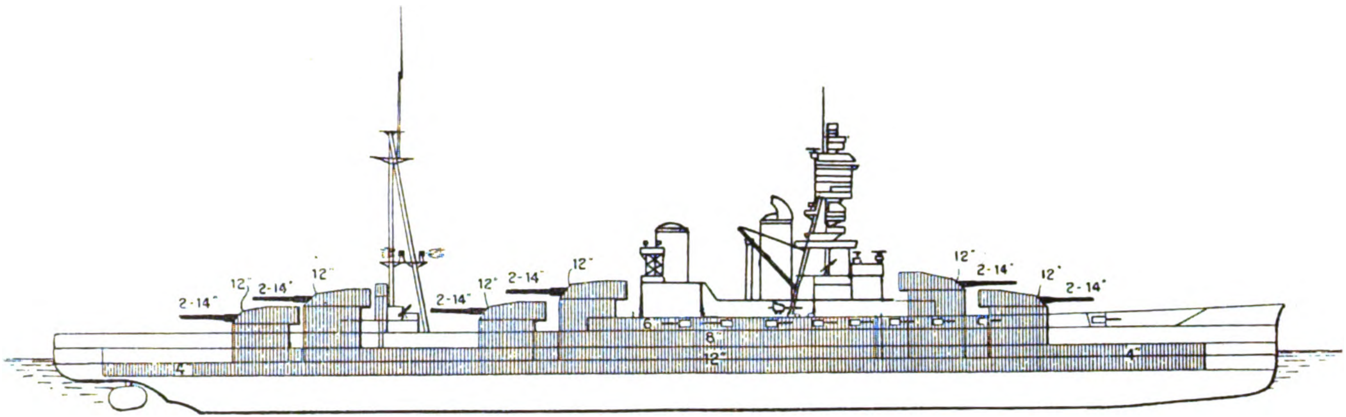
Length (extreme), 700 ft.; Length B.P., 660 ft. 7 ins.; Speed, 23 knots; 32,720 tons; Completed, 1920-1921.
Armament, 8—16-in.; 20—5·5-in.; 4—3-in. A.A.; 4 above-water and 4 submerged 21-in. torpedo tubes.

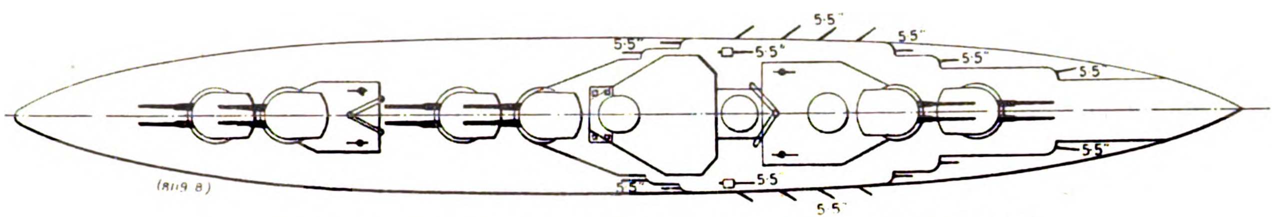
JAPAN.

BATTLESHIPS.

"Fuso" Class.

Ise. Hyuga.





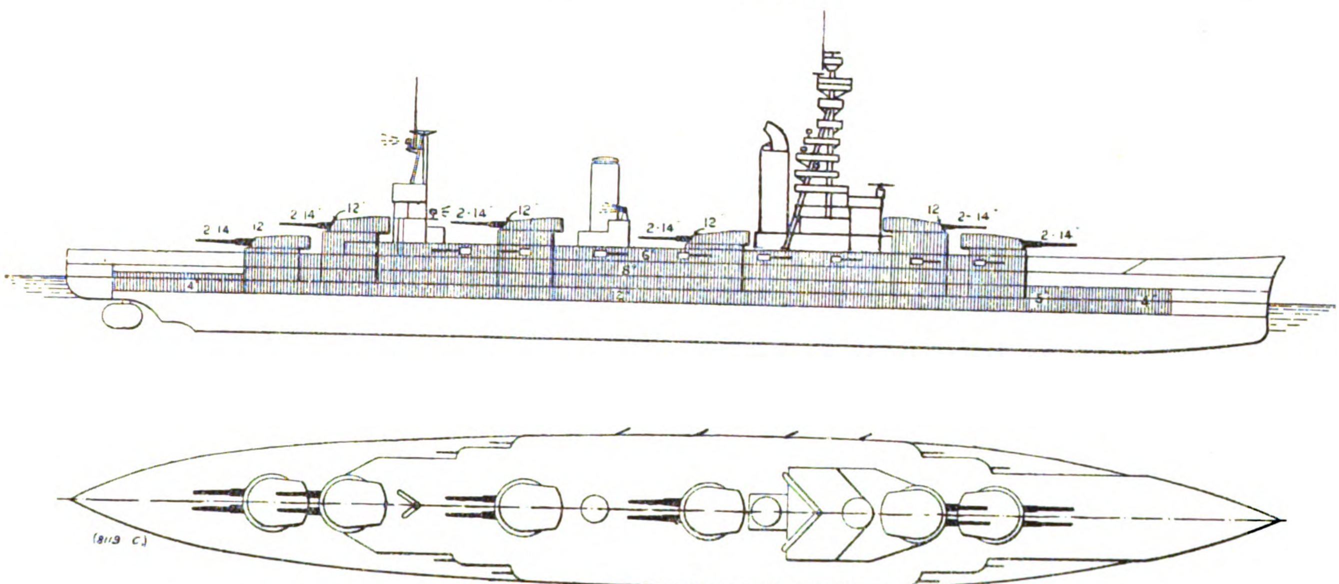
Length (extreme), 683 ft. ; Length B.P., 640 ft. ; Speed, 23 knots ; 29,990 tons ; Completed, 1917-18.
Armament, 12—14-in. ; 20—5·5-in. ; 4—3-in. A.A. 6 submerged 21-in. torpedo tubes.
2 seaplanes.

JAPAN.

BATTLESHIPS.

"Fuso" Class.

Fuso. **Yamashiro.**



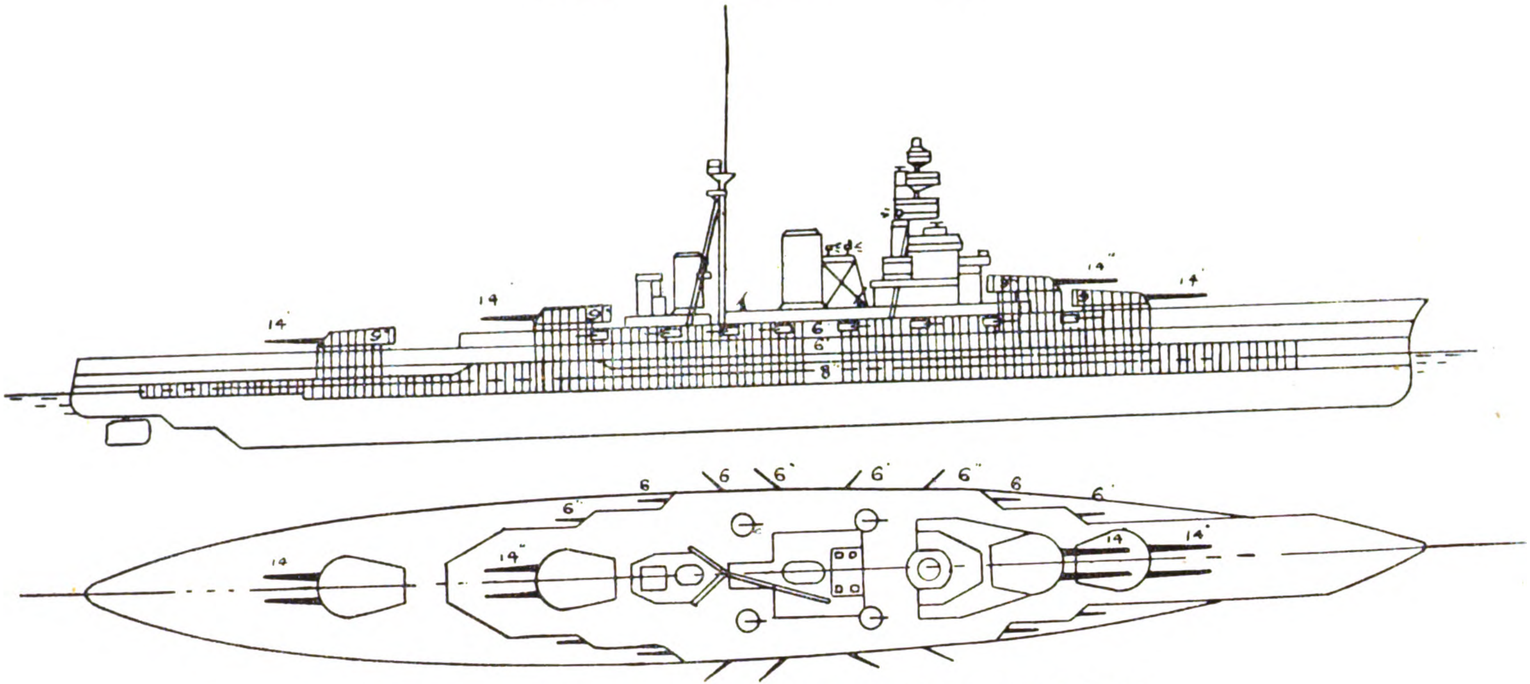
Length (extreme), 673 ft. ; Length B.P., 630 ft. ; Speed, 22·5 knots ; 29,330 tons ; Completed, 1915 17.
Armament, 12—14-in. ; 16—6-in. ; 4—3-in. A.A. ; 4 M. ; 4 L. ; 6 submerged 21-in. torpedo tubes.
1 seaplane.

JAPAN.

BATTLESHIPS.

"*Kongo*" *Class*.

Haruna. **Kirishima.** **Kongo.**



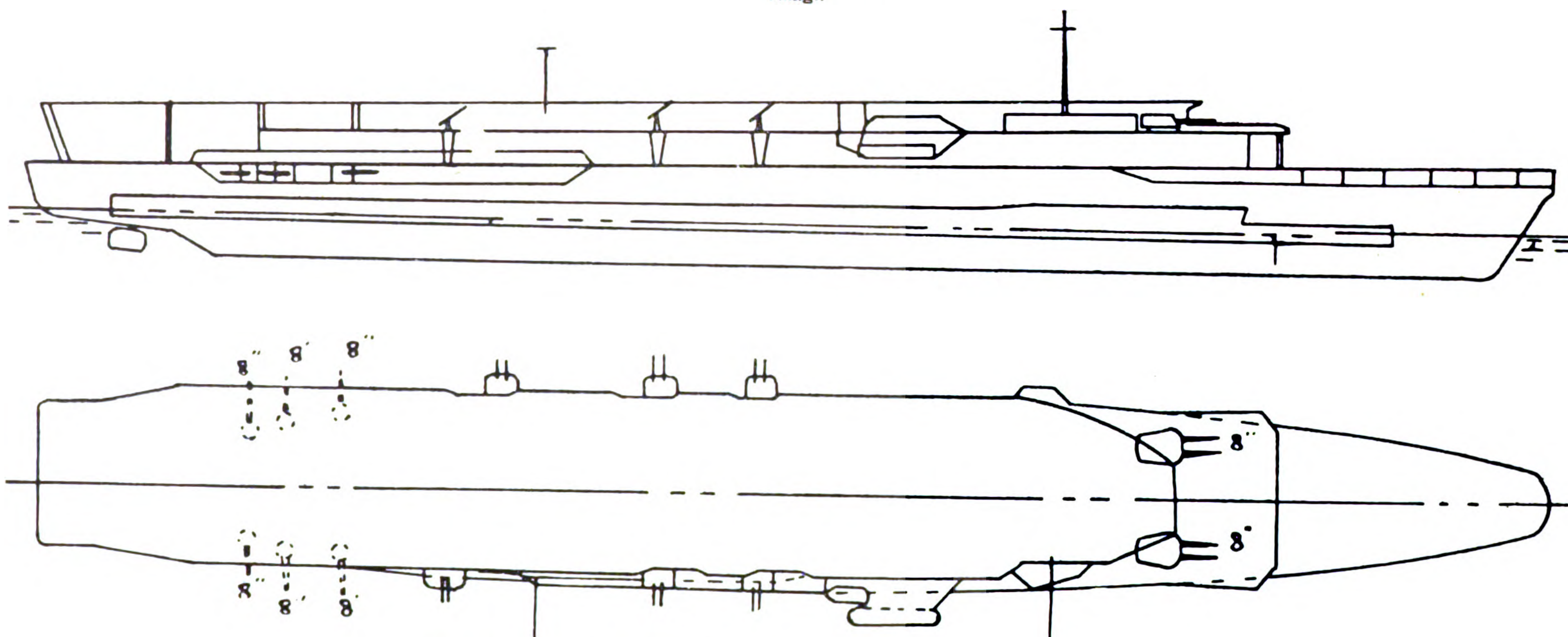
Length (extreme), 704 ft.; Speed, 26 knots; 29,330 tons; Completed, 1914–15; Modernised 1928–31.
Armament, 8—14-in.; 16—6-in.; 4—3-in. A.A.; 4 submerged 21-in. torpedo tubes.

Hiyei of this class has been converted to a Training Ship in accordance with the London Naval Treaty.

JAPAN.

AIRCRAFT CARRIER.

Akagi.

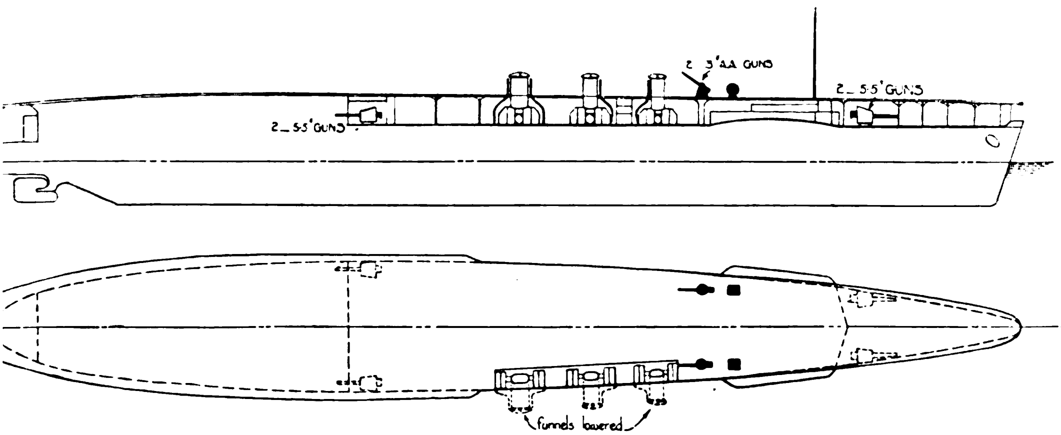


Length (between perpendiculars), 763 ft.; 26,900 tons; Speed, 28·5 knots; Completed, 1927.
Armament, 10—8-in.; 12—4·7-in. A.A. Accommodation for 50 planes.

JAPAN.

AIRCRAFT CARRIER.

Hosho

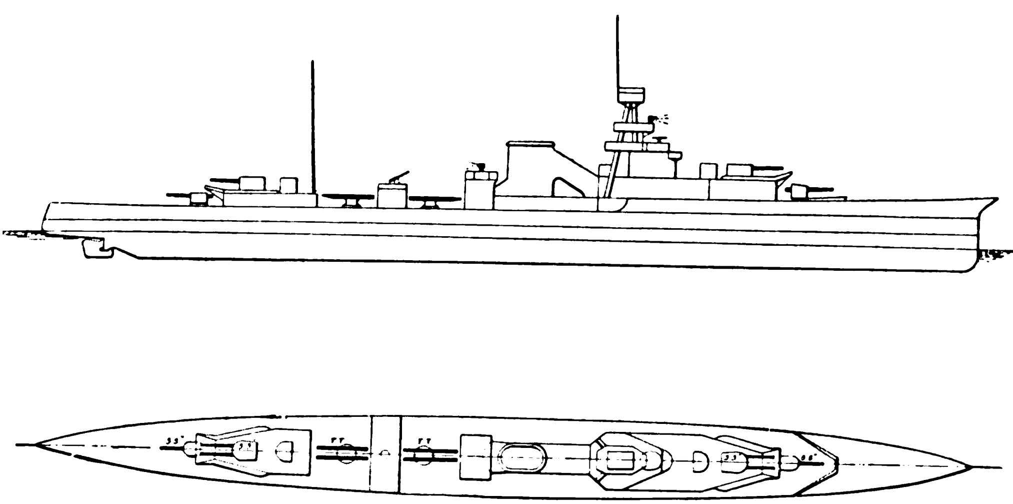


Displacement, 7,470 tons ; Length B.P., 510 ft. ; Speed, 25 knots ; Completed, 1922.
Armament, 4—5·5-in. ; 2—3-in. A.A. ; Carries about 28 planes ; Fitted with gyro-stabiliser.

JAPAN.

LIGHT CRUISER.

Yubari.

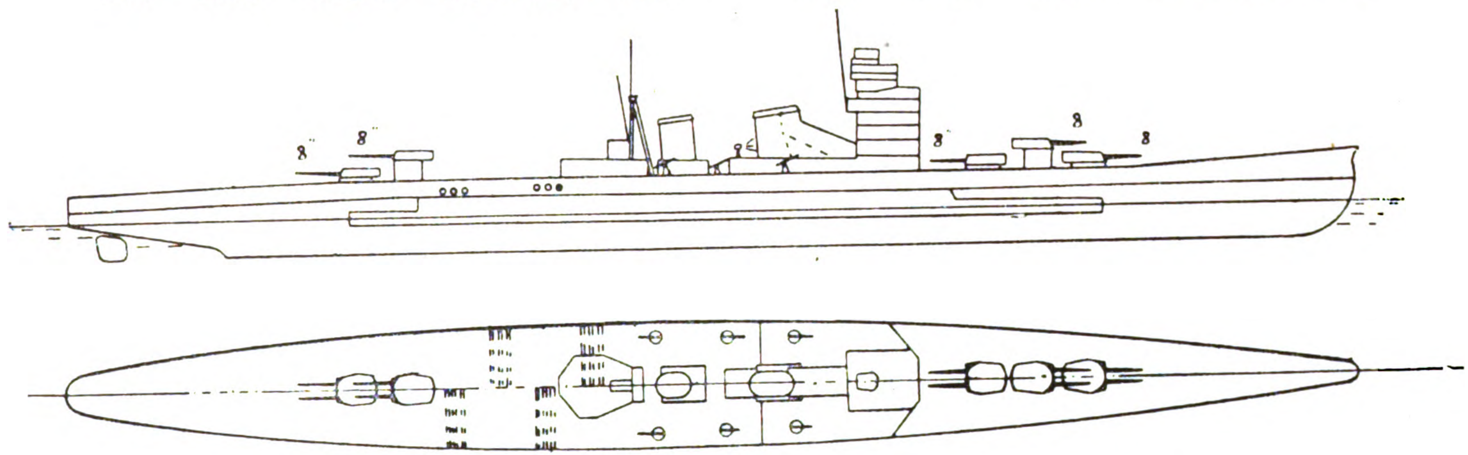


Length (extreme), 465 ft. ; Length B P., 435 ft. ; 2,890 tons ; Speed, 33 knots. Completed, 1923.
Armament, 6—5·5-in. ; 1—3 in. A.A. ; 2 M ; 2 twin 21-in. torpedo tubes; 34 mines.

JAPAN.

CRUISERS.

Nachi. Myoko. Ashigara. Haguro. (*"Nachi" Class.*) **Atago.* Takao.* Chokai.* Maya.*** (*"Takao" Class.*)



Length (between perps.), 630 ft.; "Nachi" Class, 10,000 tons; "Takao" Class, 9,850 tons; speed, 33 knots. Armament, 10—8-in.; 6—4·7-in. A.A.; 12—21-in. torpedo tubes.

* These have 4—4·7-in. A.A., and 8–21-in. torpedo tubes.

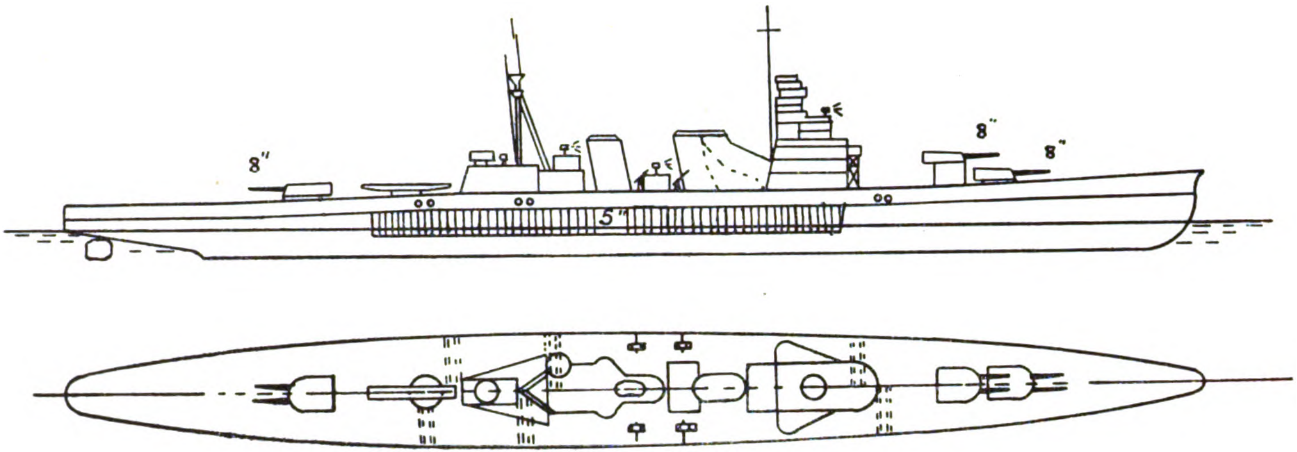
Corrections to plan: In the "Takao" class the after funnel is vertical, and the torpedo tubes are beneath the funnels on a deck higher. The four 4·7-in. A.A. guns are also a deck higher. In the "Nachi" Class the foremost pair of 4·7-in. A.A. guns are a deck higher.

JAPAN.

CRUISERS.

"Furutaka" Class.

Aoba. **Kinugasa.**



Length (extreme), 595 ft. ; 7,100 tons ; Speed, 33 knots.
Armament, 6—8-in. ; 4—4·7-in. A.A. ; 12—21-in. torpedo tubes.
1 catapult ; 2 aircraft.

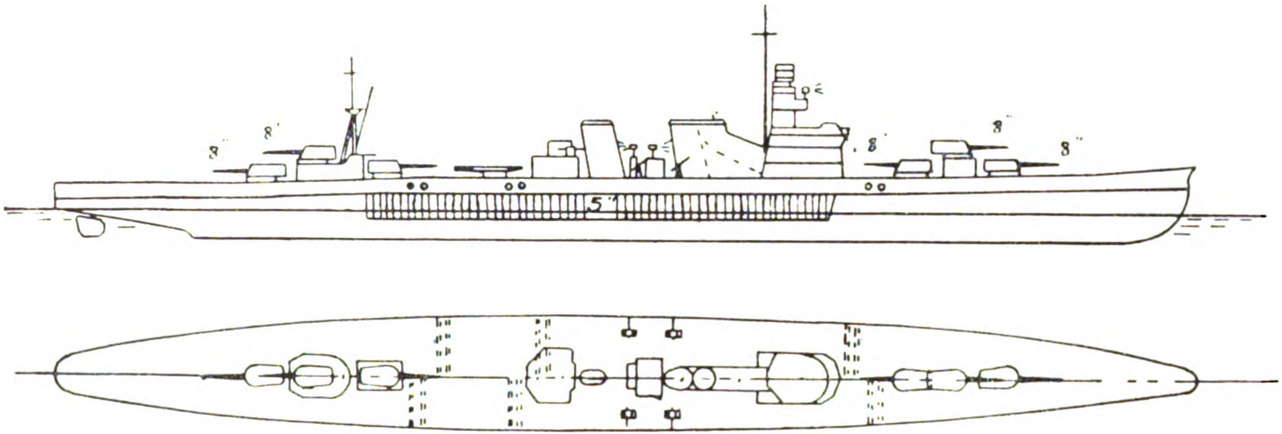
Correction to plan : The tops of the funnels are square to the funnels.

JAPAN.

CRUISERS.

"*Furutaka*" *Class*.

Furutaka. **Kako.**



Length (extreme), 595 ft.; 7,100 tons; Speed, 33 knots.
Armament, 6—8-in.; 4—3-in. A.A.; 12 above-water 21-in. torpedo tubes.
1 catapult; 1–2 aircraft.

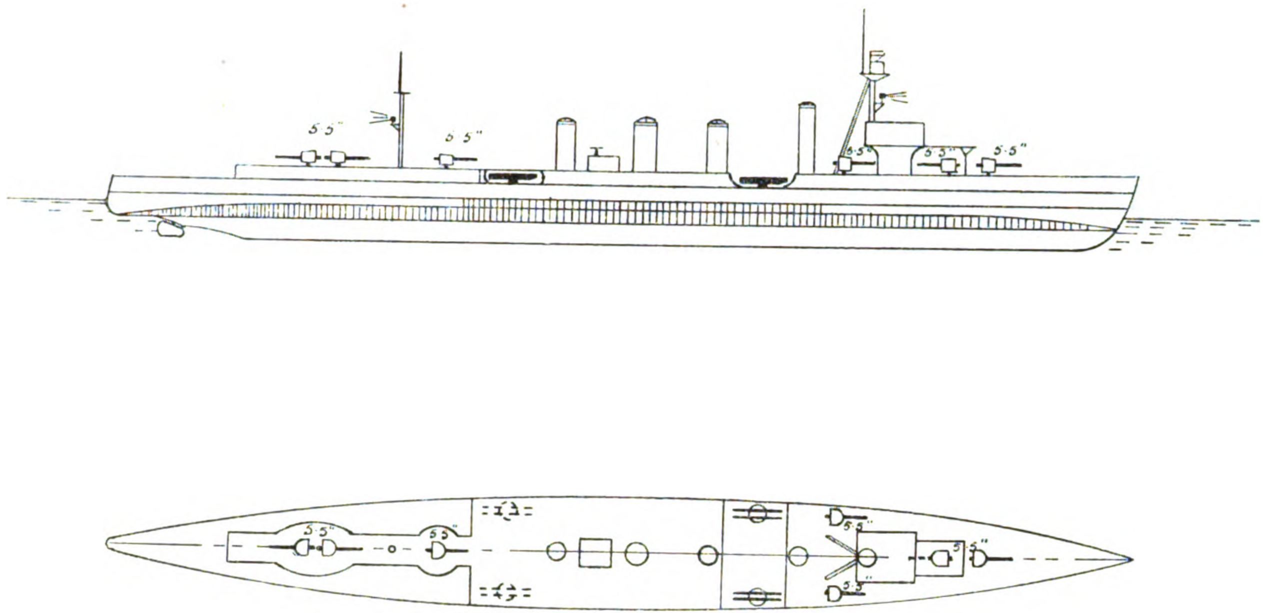
Correction to plan: The tops of the funnels are square to the funnels.

JAPAN.

LIGHT CRUISERS.

"Sendai" Class.

Naka. Sendai. Jintsu.



Length (extreme), 535 ft. ; Speed, 33 knots ; 5,195 tons ; Completed, 1924–25.
Armament, 7—5·5-in. ; 2—3-in. A.A. ; 4 twin 21-in. torpedo tubes.
1 seaplane.

Correction to plan : Bows of Jintsu and Naka have been modified to give more flair.

JAPAN.

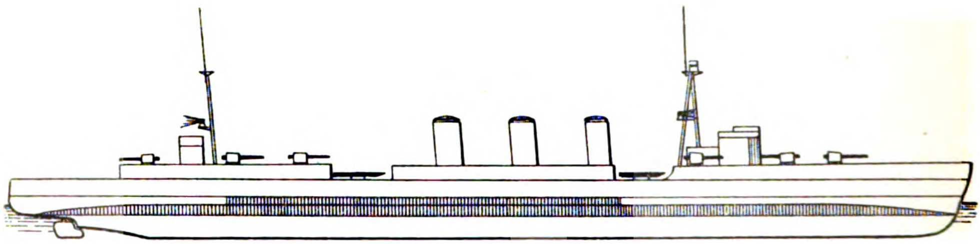
LIGHT CRUISERS.

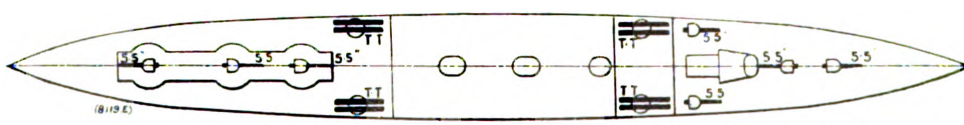
"Natori" Class.

* { Isudzu. Nagara. } * { Natori. Yura. } * { Kinu. Abukuma. }

"Kuma" Class.

Oi. Kiso. Kitakami. Tama. Kuma.





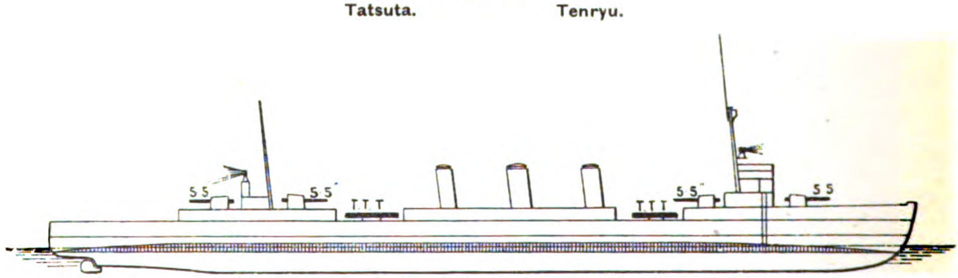
Length (extreme), 535 ft.; Length B.P., 500 ft.; Speed, 33 knots; 5,100 tons; Completed, 1920–21.
Armament, 7—5·5-in.; 2—3-in. A.A.; 2 M.; 4 twin above-water 21-in. torpedo tubes.

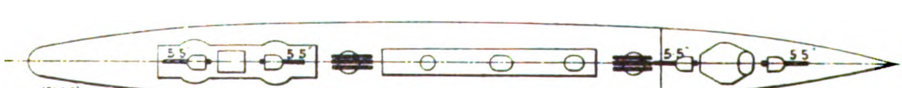
* **Plans apply generally to these vessels except that aircraft hangar and a catapult are arranged in bridge structure.** The displacement is 70 tons higher than Oi, etc. These vessels were completed, 1922–23.

LIGHT CRUISERS.

"Tenryu" Class.

Tatsuta. Tenryu.



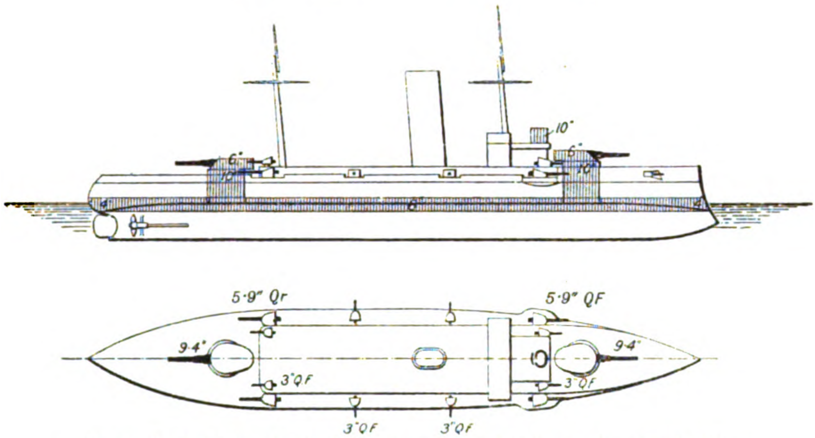


Length (extreme), 468 ft.; Speed, 31 knots; 3,230 tons; Completed, 1919.
Armament, 4—5·5-in.; 1—3-in. A.A.; 2 M.; 2 triple above-water torpedo tubes.
Fitted for Minelaying.

NETHERLANDS.

COAST DEFENCE SHIPS.

Hertog Hendrik. Marten Tromp.



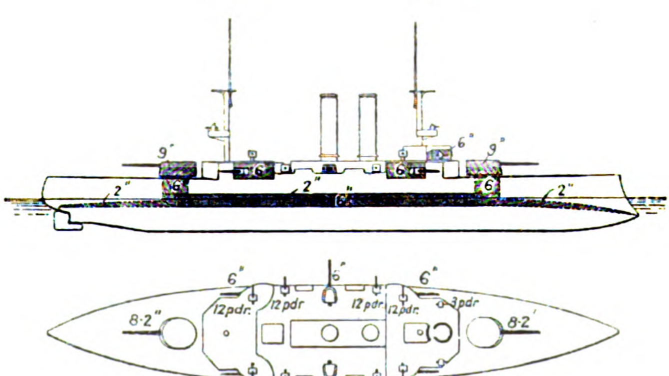
Hertog Hendrik : Length, 317 ft. ; 4,371 tons ; Speed, 16 knots ; Completed, 1903.
2—9·4-in. ; 6—5·9-in. ; 4—3-in. ; 7 small.

Marten Tromp : Length, 330 ft. ; 4,562 tons ; Speed, 16 knots ; Completed, 1906.
2—9·4-in. ; 4—5·9-in. ; 8—3-in. ; 7 small.

NORWAY.

COAST DEFENCE SHIPS.

Norge. Eidsvold

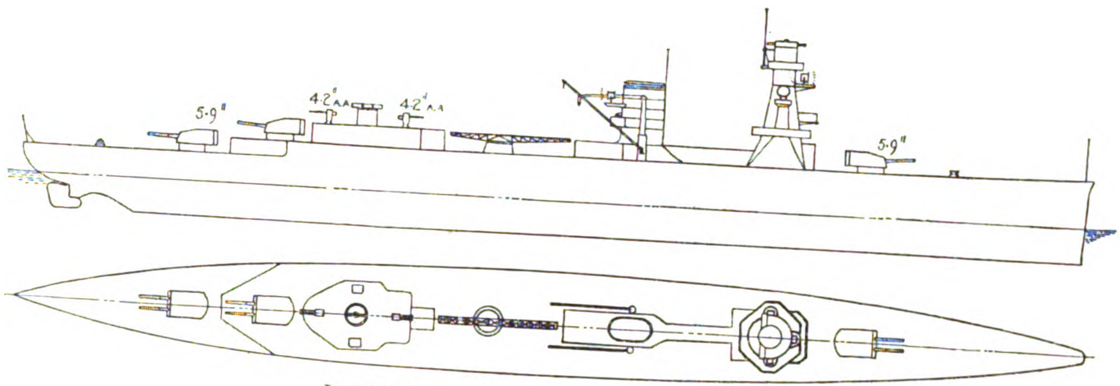


Length, 310 ft. ; 4,166 tons ; Speed, 16·5 knots ; Completed, 1901.
Armament, 2—8·2-in. ; 6—6-in. ; 8—3-in. ; 6—3-pr. ; 2 submerged 18-in. torpedo tubes.

NETHERLANDS.

CRUISER.

Celebes.



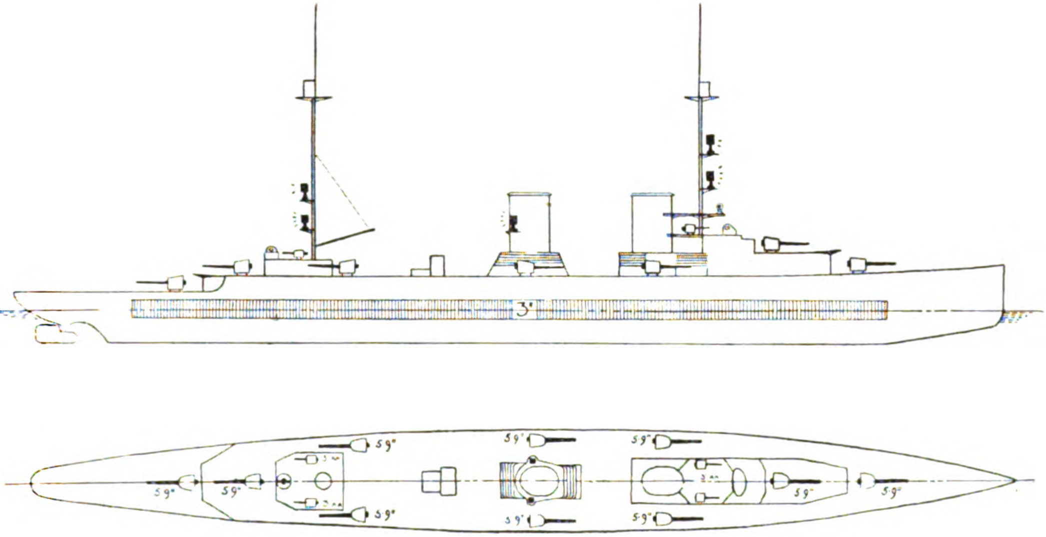
Length (extreme), 560 ft.; 5,900 tons; Speed, 32 knots.
Armament, 6—5·9-in.; 4—4·2-in. A.A.; 4 M.

Building at Rotterdam.

NETHERLANDS.

CRUISERS.

Java. Sumatra.

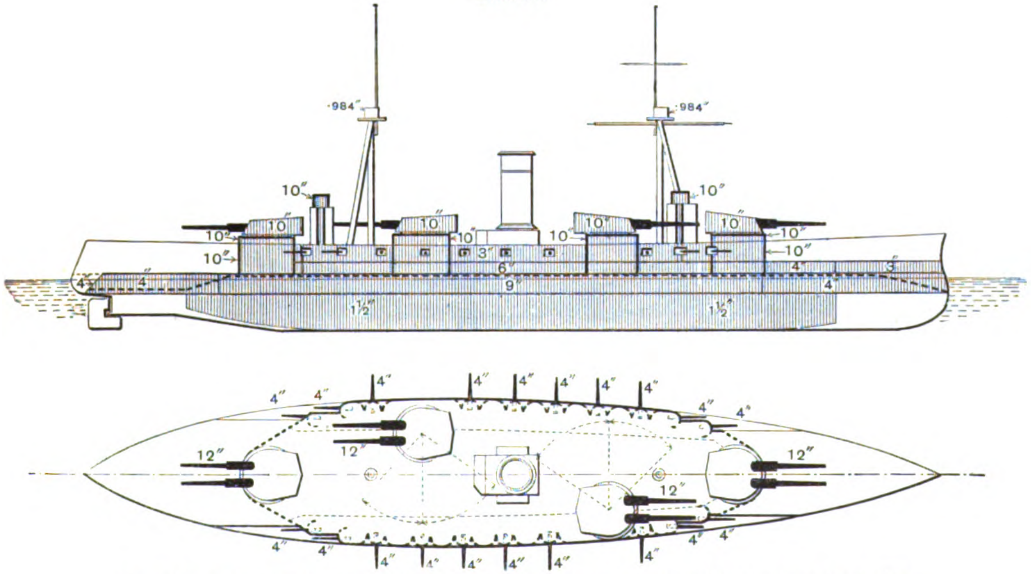


Length, 509½ ft. ; 6,670 tons ; Speed, 30 knots ; Completed, 1925-26.
Armament, 10—5·9 in. ; 4—3-in. A.A. ; 8 M.
40 mines ; 2 seaplanes.

SPAIN

BATTLESHIP.

Jaime I.

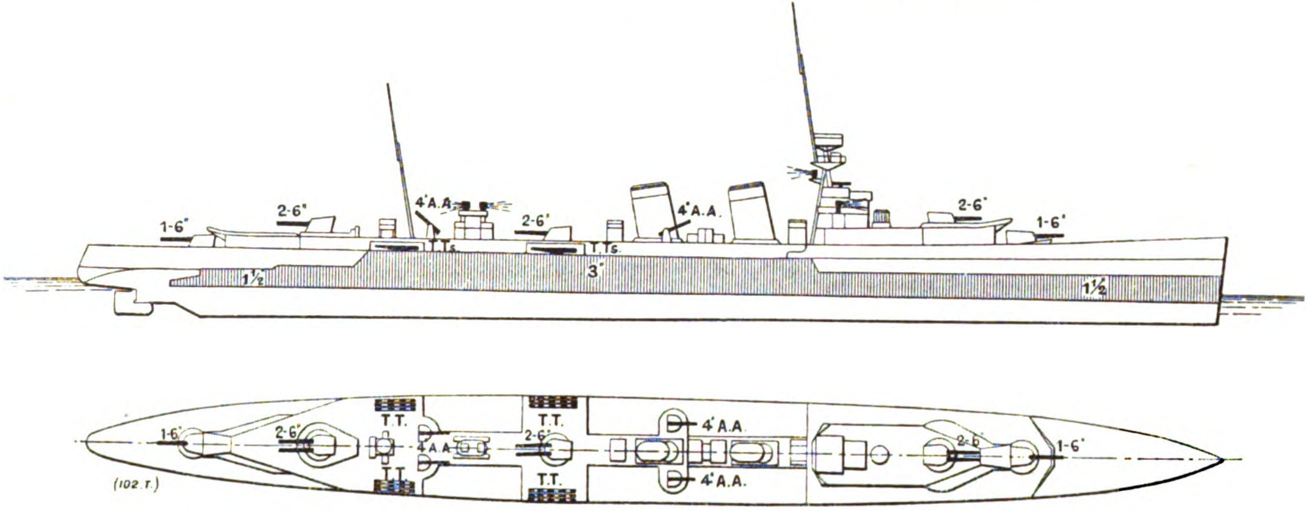


Length (extreme), 459 ft. ; Length W.L., 435 ft. ; 14,224 tons ; Speed, 19·5 knots ; Completed, 1921.
Armament, 8—12-in. ; 20—4-in. ; 4—3-pr. ; 4—3 pr. A.A. ; 2 M.

SPAIN.

CRUISERS.

Libertad (*ex*-Principe Alfonso). Almirante Cervera. Miguel de Cervantes.



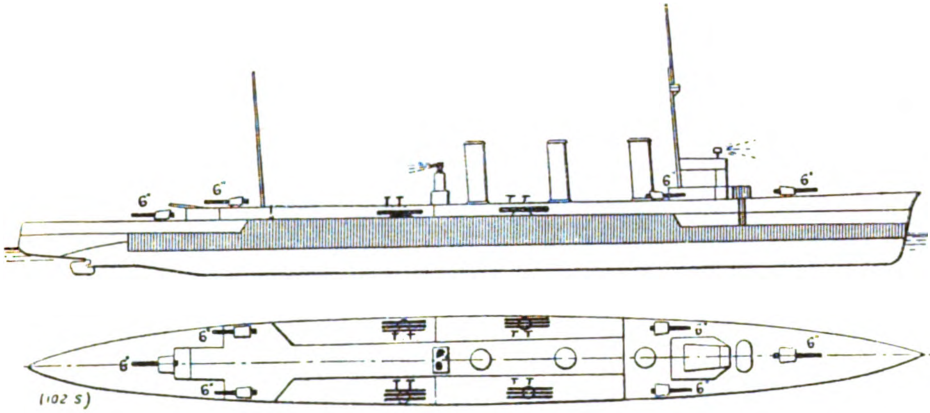
Length (extreme), 579 ft. 6 ins. ; Length B.P., 545 ft. ; 7,475 tons ; Speed, 33 knots.
Armament, 8—6-in. ; 4—4-in. A.A. ; 2—3 pr. ; 4 triple above-water torpedo tubes (21-in. torpedoes).

Corrections to plan : The mainmast is tripod. There is no foretopmast.

SPAIN.

LIGHT CRUISER.

Mendez Nuñez.

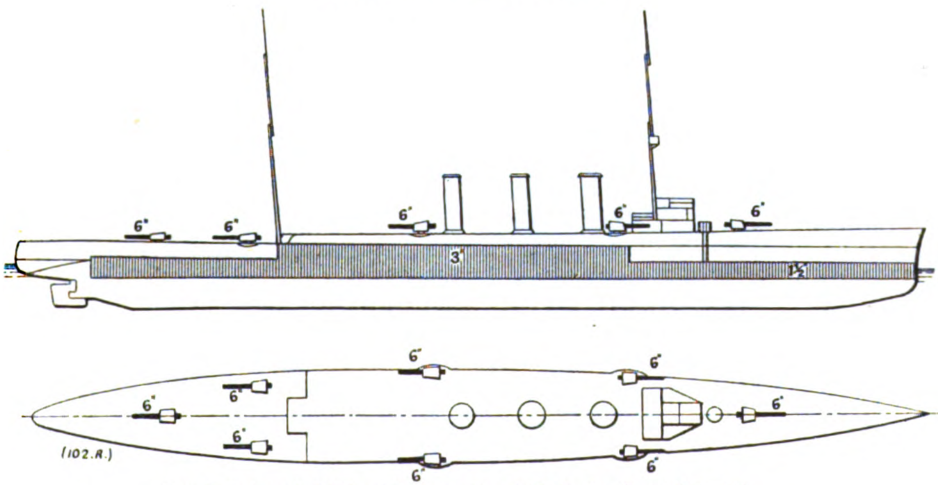


Length (extreme), 462 ft. ; Length B.P., 439 ft. ; 4,509 tons ; Speed, 29 knots. Completed, 1924.
Armament, 6—6-in. ; 4—3-pr. A.A. ; 4 M. ; 4 above-water triple torpedo tubes (21-in. torpedoes).

NOTE.—The armour belt is 3 ins. thick, tapering to 1½ ins. at the ends.

LIGHT CRUISER.

Republica (*ex*-Reina Victoria Eugenia).



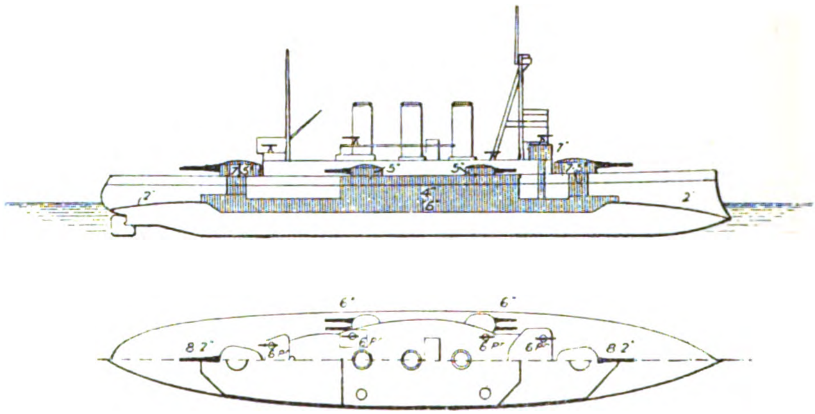
Length (extreme), 462 ft. ; 4,857 tons ; Speed, 25¼ knots ; Completed, 1922.
Armament, 9 *—6-in. ; 1—3-in. ; 4—3-pr. A.A. ; 4 M. ; 1 L. ; 4—21-in. torpedo tubes.

* Correction to plan : There should be two 6-in. guns abreast forward instead of one on the centre line as shown.

SWEDEN.

BATTLESHIP.

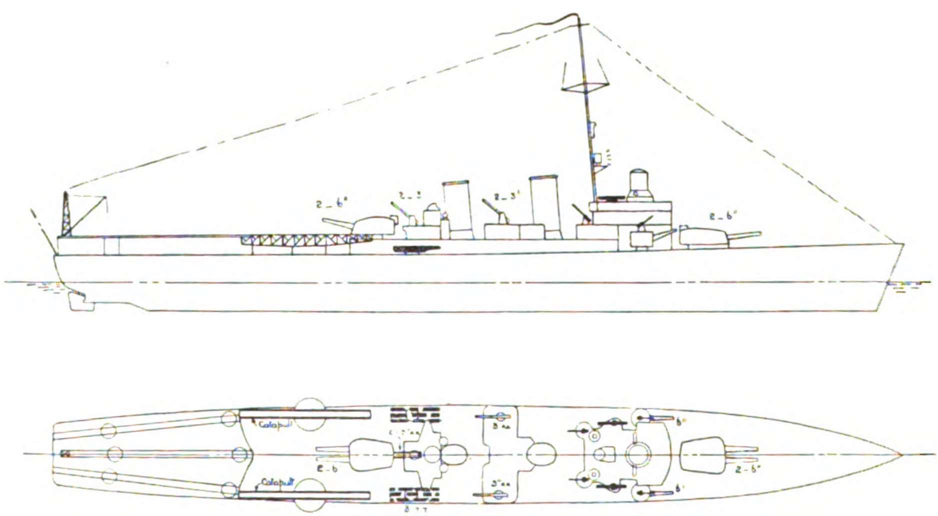
Oscar II.



Length. 313·6 ft. ; 4,085 tons ; Speed, 18 knots ; Completed, 1907.
Armament, 2—8·2-in. ; 8—6-in. ; 8—6-pr. ; 1—1-pr ; 2 submerged 18-in. torpedo tubes.

AIRCRAFT CRUISER.

Gotland.



Length, 442 ft. ; 4,527 tons ; 33,000 H.P. ; Speed, 27 knots. Building (estimated completion, 1934).
Armament, 6–6-in. ; 4—3-in. A.A. ; 4 M. ; 6—21-in. torpedo tubes.

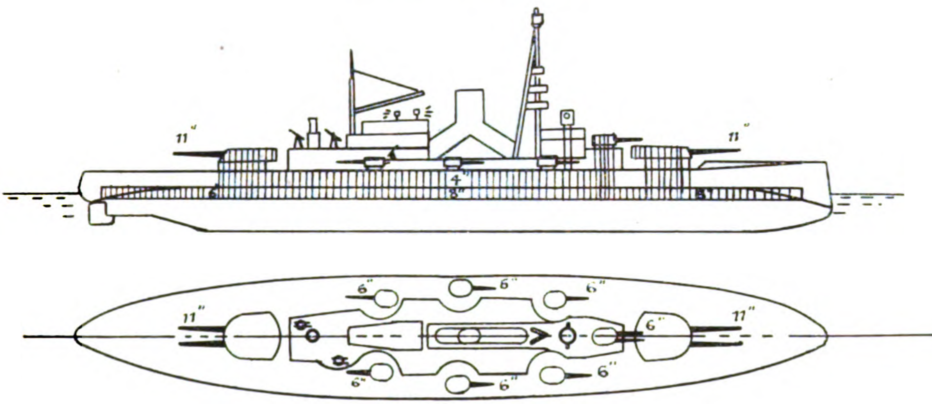
Correction to plan : 1 middle line catapult will be fitted instead of two.

SWEDEN.

COAST DEFENCE SHIPS.

Gustav V. **Sverige.**

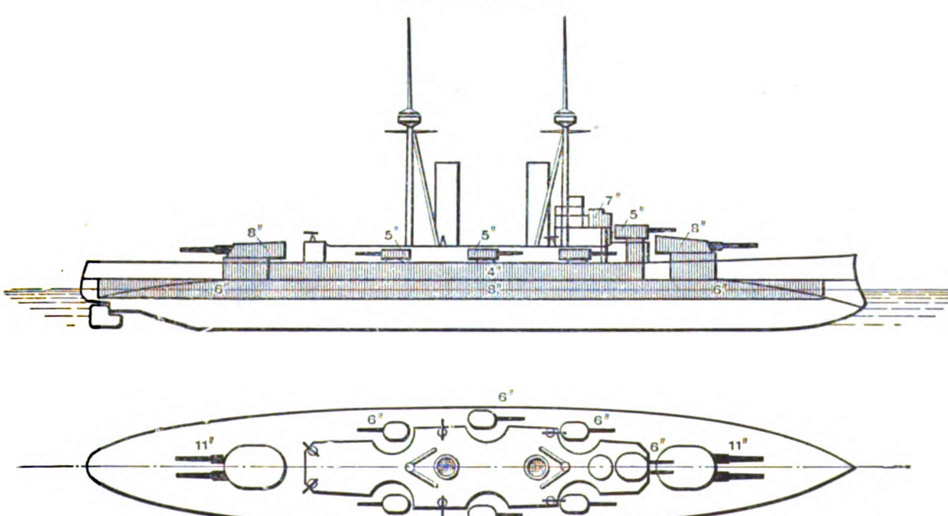
(As reconstructed 1924–29.



Length, 396·7 ft. ; 6,899 tons ; Speed, 22 knots ; Completed, 1917–1921.
Armament, 4—11-in. ; 8—6-in. ; 6—3-in. ; 2—6-pr. ; 2 M.

COAST DEFENCE SHIP.

***Drottning Victoria.**



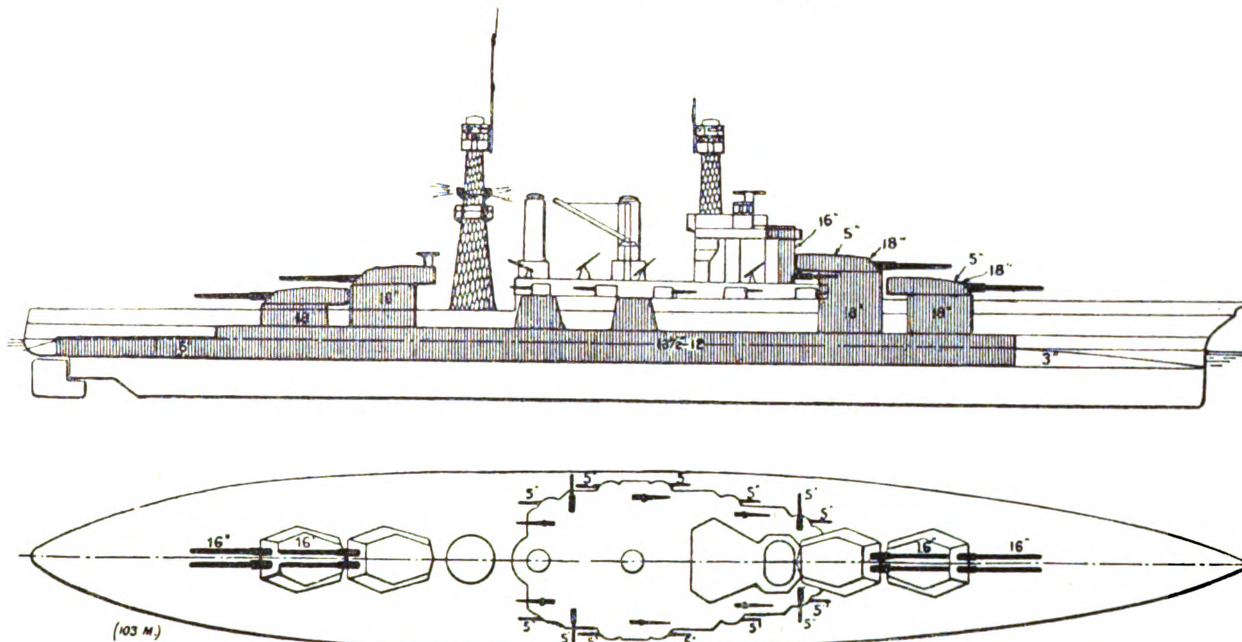
Length, 396·7 ft. ; 6,899 tons ; Speed, 23 knots ; Completed, 1921.
Armament, 4—11-in. ; 8—6-in. ; 6—3-in. ; 2—6-pr. ; 2 M.

* To be reconstructed and modernised as Gustav V and Sverige above.

UNITED STATES.

BATTLESHIPS.

Colorado. Maryland. West Virginia.



Length (extreme), 624 ft. ; Length W.L., 600 ft. ; Speed, 21 knots ; 32,600 tons ; Maryland, completed, 1921 ; Colorado and West Virginia, completed, 1923.

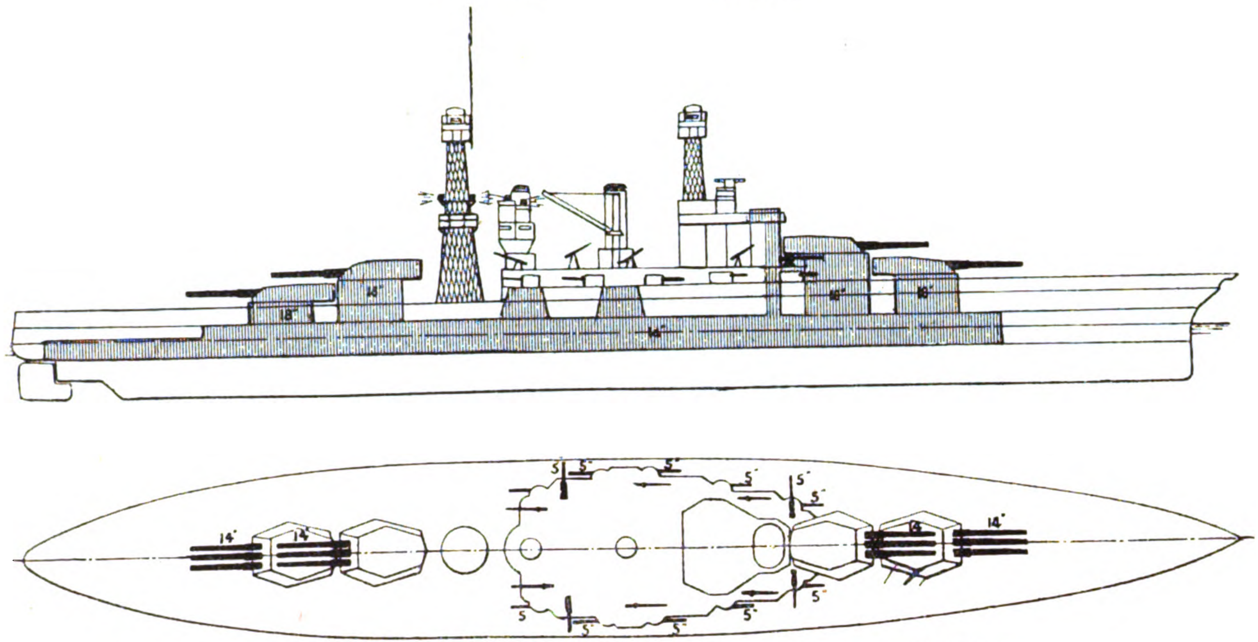
Armament 8—16-in. ; 12—5-in. ; 8—5-in. A.A. ; 4—6-pr. ; 2 submerged 21-in. torpedo tubes

Catapult mounted right aft on Quarter Deck ; 3 aircraft.

UNITED STATES

BATTLESHIPS.

California. Tennessee.



Length (extreme), 624 ft. ; Length W.L., 600 ft. ; Speed, 21 knots ; 32,300 tons ; Completed, 1920–21.
Armament, 12—14-in. ; 12—5-in. ; 8—5-in. A.A. ; 4—6-pr. ; 2—1-pr. ; 2 submerged 21-in. torpedo tubes.
2 catapults (one right aft on Quarter Deck and one on the third turret) ; 3 seaplanes.

UNITED STATES.

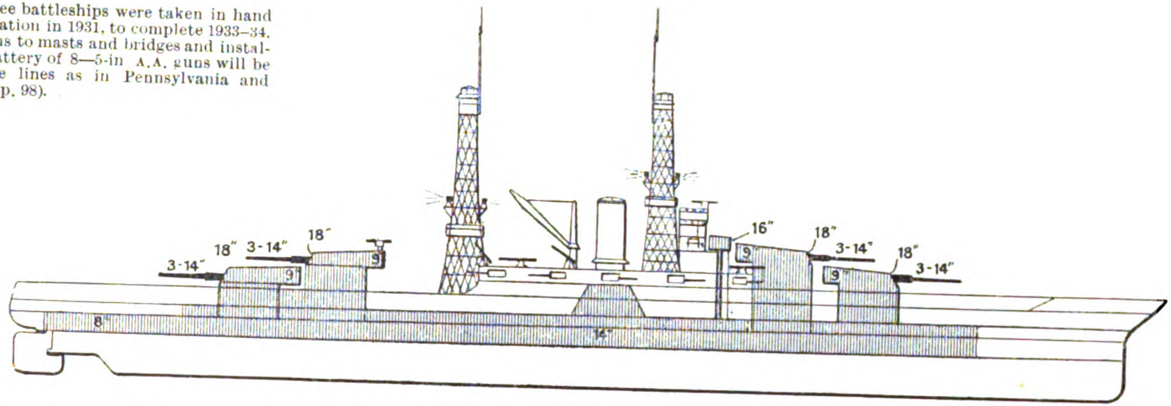
BATTLESHIPS.

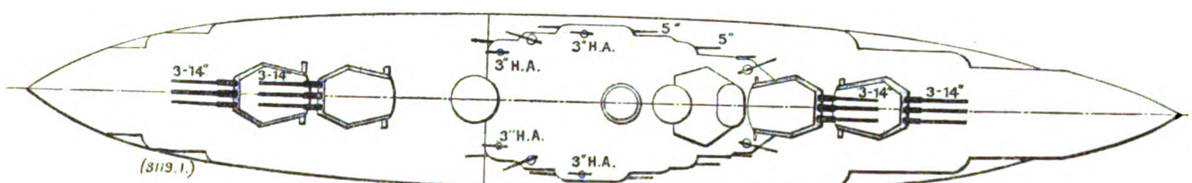
Idaho. **New Mexico.** **Mississippi.**

(Before modernisation.)

These three battleships were taken in hand for modernisation in 1931, to complete 1933–34.

Alterations to masts and bridges and installation of a battery of 8—5-in A.A. guns will be on the same lines as in Pennsylvania and Arizona (see p. 98).





Length (extreme), 624 ft.; Length W.L., 600 ft.; Speed, 21 knots; 32,000 tons; Completed, 1917-19.
Armament, 12—14-in.; 12—5-in.; 8—3-in A.A.; *4—6-pr.; 2 submerged 21-in. torpedo tubes.

* Idaho, 4—3-pr.

Catapult mounted right aft on Quarter Deck; 3 aircraft.

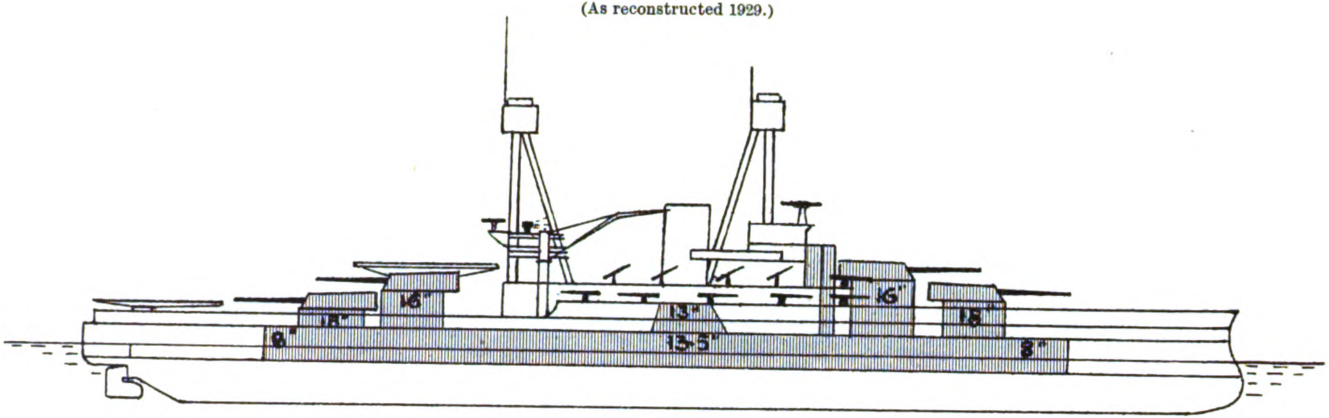
Mississippi has an additional turret catapult.

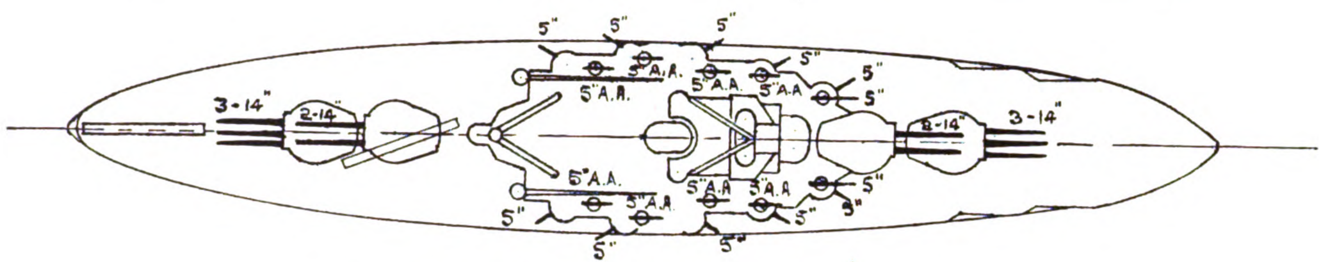
UNITED STATES.

BATTLESHIPS.

Nevada. **Oklahoma.**

(As reconstructed 1929.)





Length (extreme), 583 ft.; Length W.L., 575 ft.; Speed, 20·5 knots; 29,000 tons.

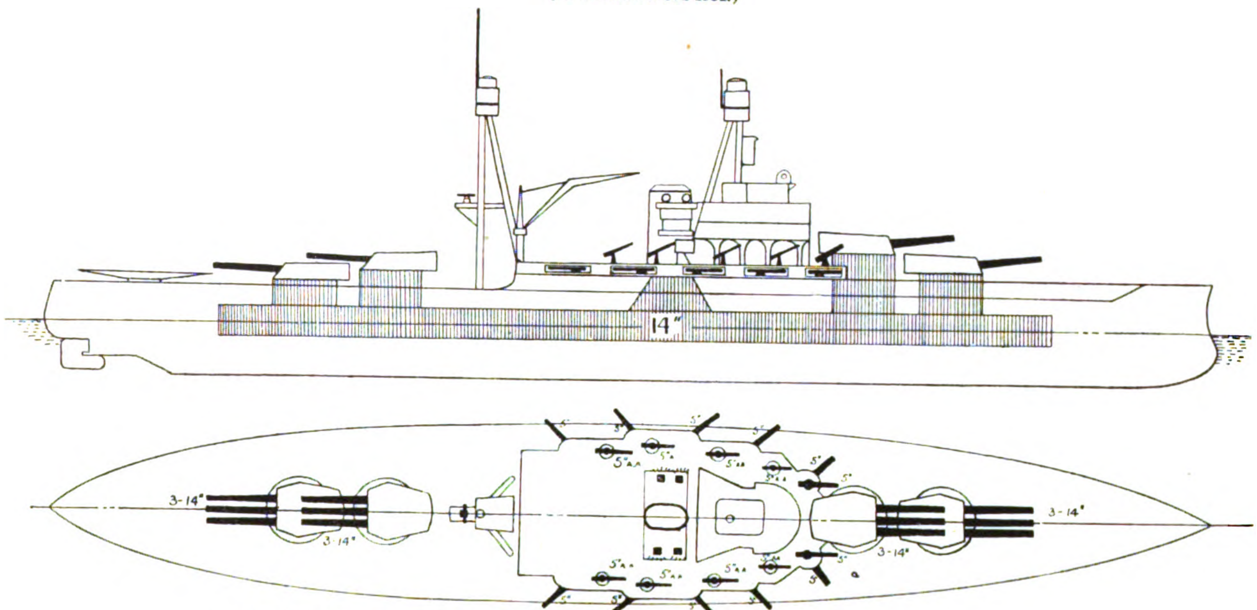
Armament, 10—14-in.; 12—5-in.; 8—5-in. A.A.; 4—6-pr. (Oklahoma, 4—3-pr.); 2—1-pr.; 2 M.; 2 L.; 2 catapults; 3 aeroplanes.

UNITED STATES.

BATTLESHIPS.

Arizona. **Pennsylvania.**

(As reconstructed 1931.)



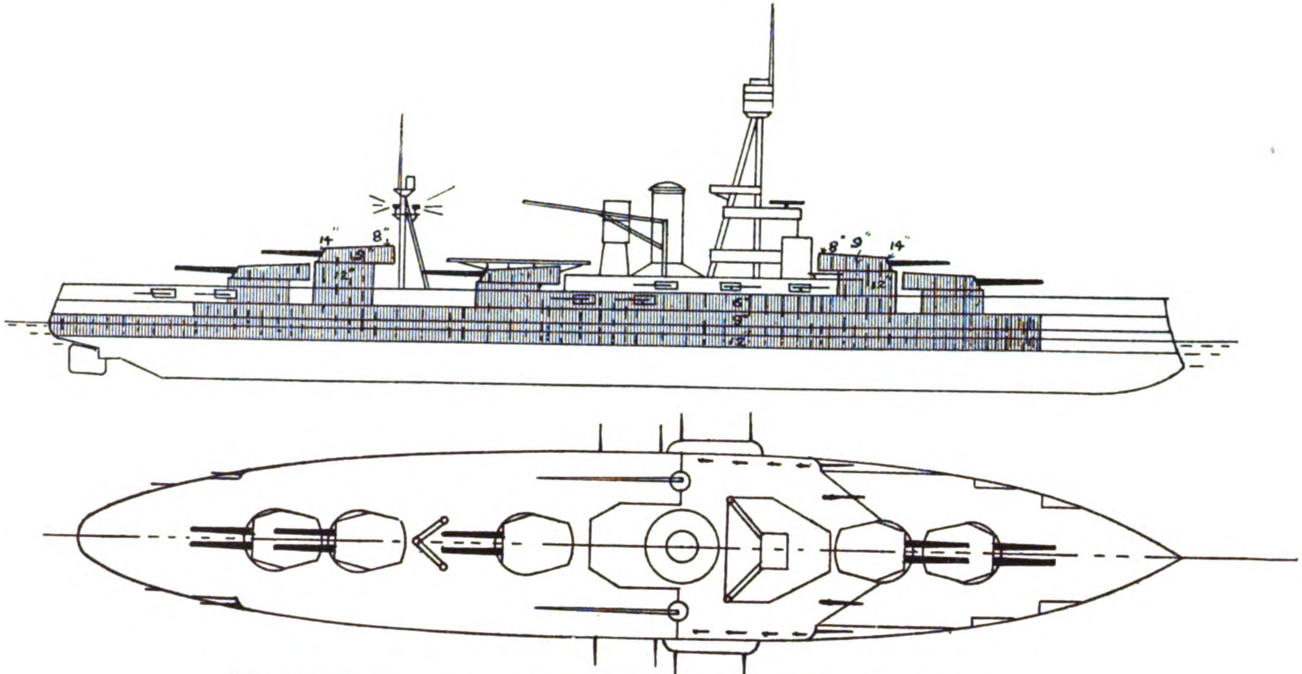
Length (extreme), 608 ft.; Length B.P., 596 ft.; Speed, 21 knots; 32,100 tons; Completed, 1916.
Armament, 12—14-in.; 12—5-in.; 8—5-in. A.A.; 4—3-pr.; 2—1-pr.; 2 M.; 2 L.; 2 catapults; 3 aircraft.

UNITED STATES.

BATTLESHIPS.

New York. **Texas**

(As reconstructed 1927.)



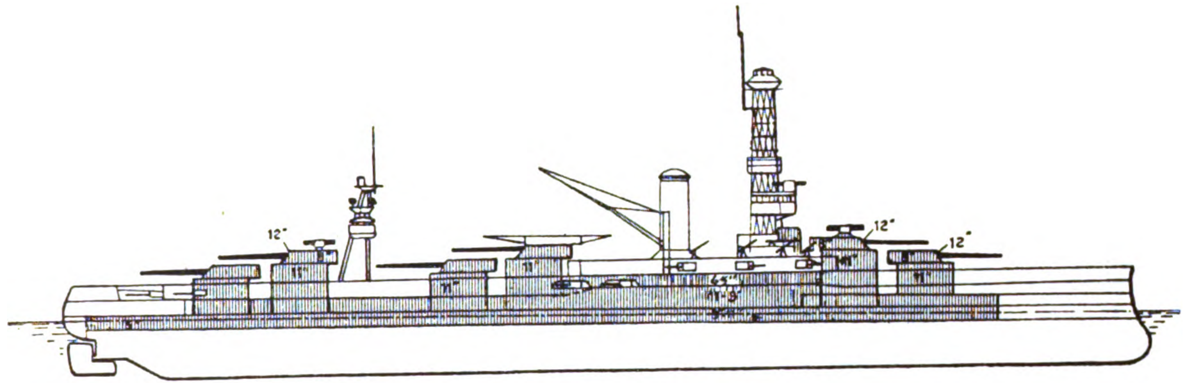
Length (extreme), 573 ft.; Length W.L., 565 ft.; Speed, 21 knots; 27,000 tons; Completed, 1914.
Armament, 10—14-in.; 16—5 in.; 8—3-in. A.A.; 4—3-pr.; 2—1-pr.; 2 M.; 1 catapult; 3 aircraft.

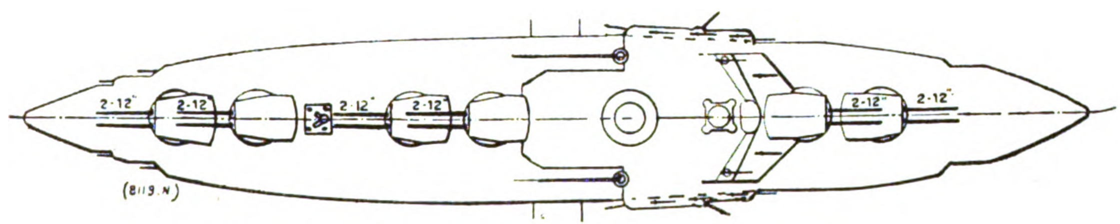
UNITED STATES.

BATTLESHIP.

Arkansas.

(As reconstructed 1927.)





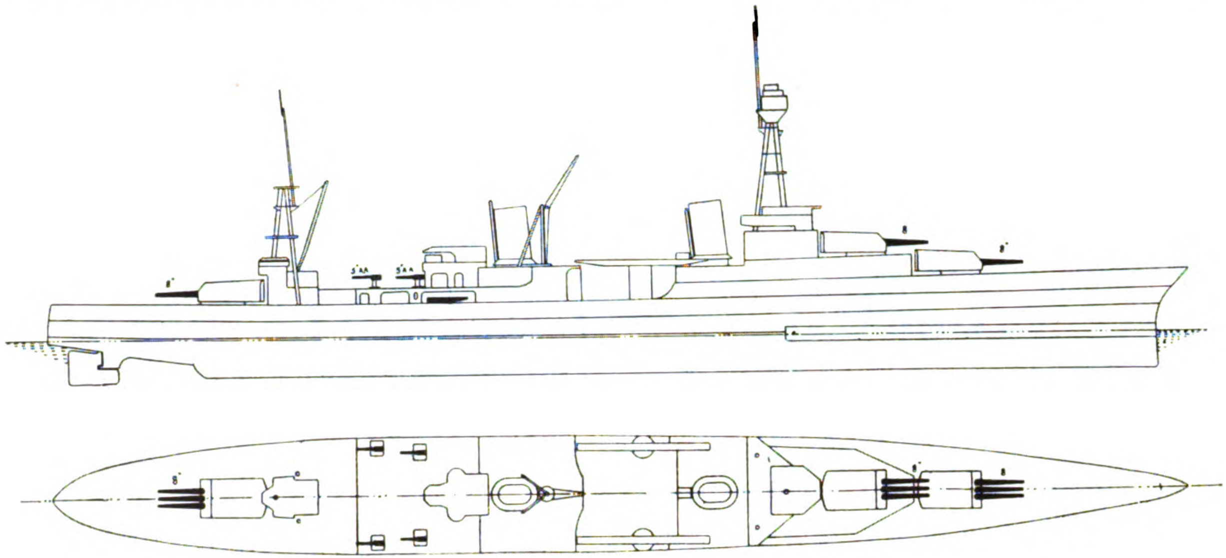
Length (extreme), 562 ft. ; Length, W.L., 554 ft. ; Speed, 20·5 knots ; 26,100 tons ; Completed, 1912.
Armament, 12—12-in. ; 16—5-in. ; 8—3-in. A.A. ; 4—3-pr. ; 2—1-pr. ; 2 M. ; 1 catapult ; 3 aircraft.

Wyoming, a sister ship, has been demilitarised and converted to a training ship.

UNITED STATES.

CRUISERS.

Northampton. **Chester.** **Louisville.** (*"Chester" Class.*)
Portland. **Indianapolis** (*"Portland" Class.*)
Chicago. **Houston.** **Augusta.** (*"Augusta" Class.*)
New Orleans.* **Astoria.*** **Minneapolis.*** **San Franscisco.*** **Tuscaloosa.*** (*"Astoria" Class.*)



"Chester" and "Augusta" Classes: Length (extreme), 600 ft.; 9,050–9,300 tons; Speed, 32·5 knots; Completed, 1930–31. Armament, 9—8-in.; 4—5-in. A.A.; 2—3-pr.; 2 triple 21-in. torpedo tubes; 2 catapults; 4–6 seaplanes.

"Portland" Class: Length (on water-line), 584 ft.; Portland, 9,800 tons; Indianapolis, 9,950 tons; Speed, 32¼ knots; Completed, 1932–33. Armament, 9—8-in.; 8—5-in. A.A.; 10 smaller; 6—21-in torpedo tubes; 2 catapults; 4–6 aircraft.

The 4 additional 5-in. A.A. guns are carried abreast the after funnel.

* These cruisers (10,000 tons displacement, 578 ft. extreme length), which are still building, have 8—5-in. A.A. guns and are reported to be generally similar to above, but have no mainmasts, and "block" bridges instead of tripod foremasts.

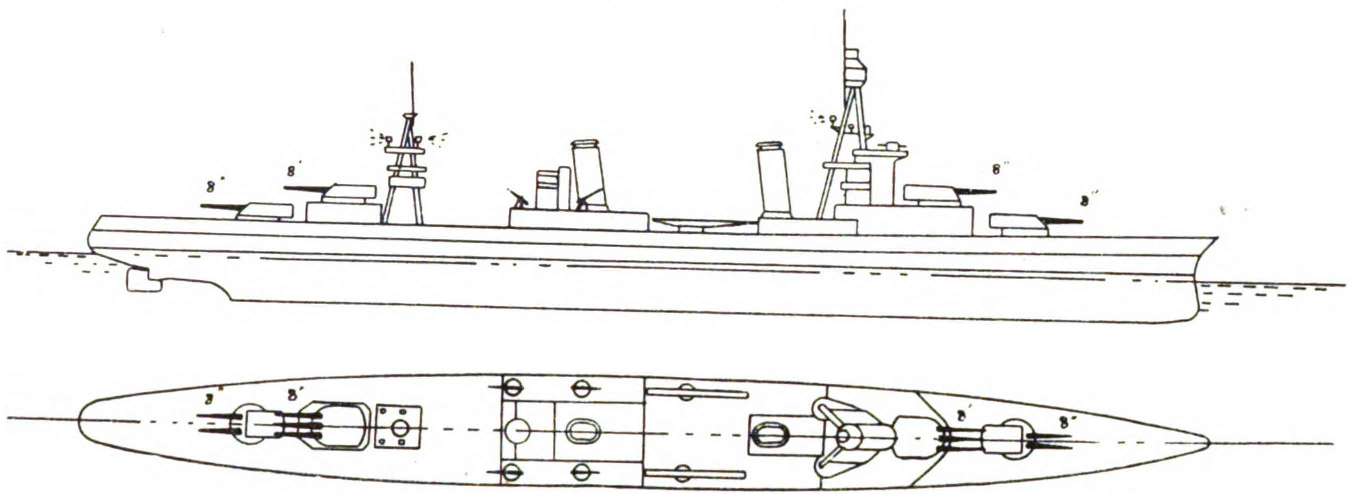
Both the Astoria and the Portland Classes are reported to have better protection than the earlier cruisers.

UNITED STATES.

CRUISERS.

"Pensacola" Class.

Salt Lake City. **Pensacola.**



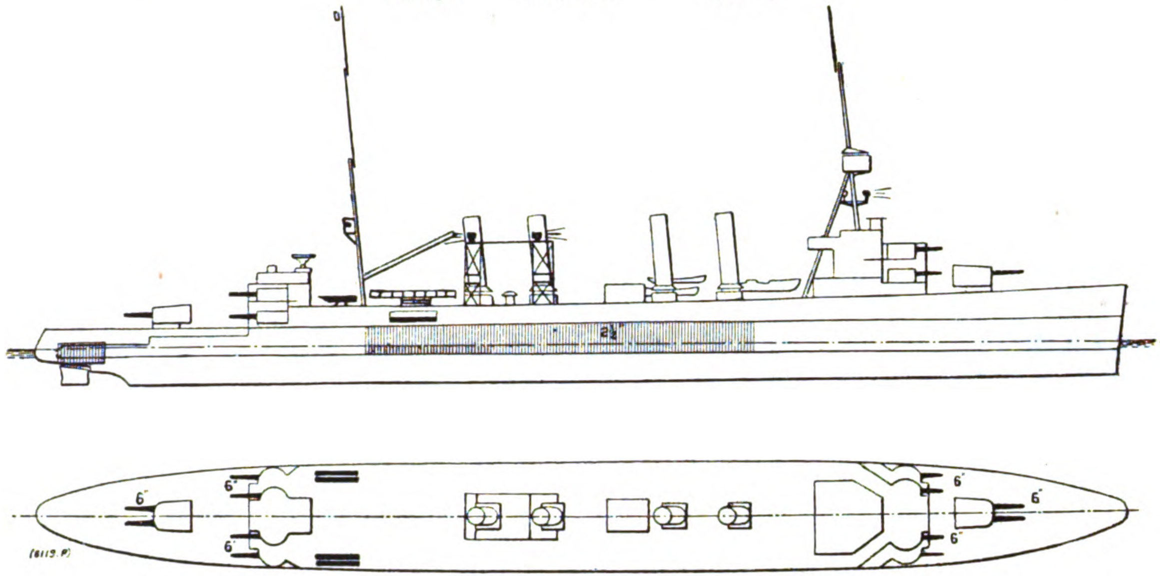
Length (extreme), 585½ ft. ; 9,100 tons ; Speed, 32½ knots ; Completed, 1930.
Armament, 10—8-in. ; 4—5-in. A.A. ; 2—3-pr. ; 2 triple 21-in. torpedo tubes.
2 catapults ; 4 seaplanes.

UNITED STATES.

SCOUT CRUISERS.

"Omaha" Class.

Cincinnati.	Concord.	Detroit.	Marblehead.	Memphis.	Milwaukee.	Omaha.
		Raleigh.	Richmond.	Trenton.		



Length (extreme), 555 ft. 6 ins.; Length W.L., 550 ft.; Speed, 33·7 knots; 7,050 tons. Completed in 1923-25.

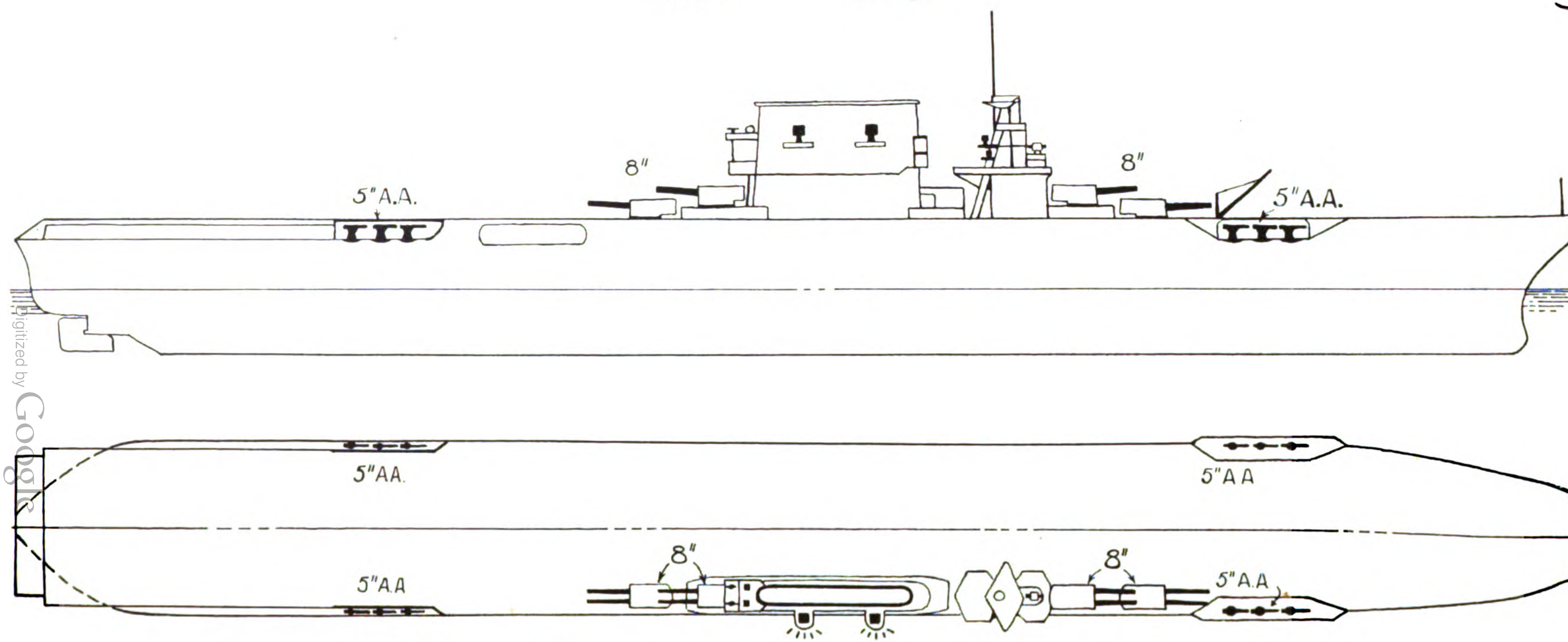
Armament, 12—6-in. (Marblehead, 11—6-in.; Cincinnati, Detroit, Raleigh and Richmond, 10—6-in.); 4—3-in. A.A.; 2—3-pr.; 2 triple above-water 21-in. torpedo tubes; 2 catapults; 2 aeroplanes.

Corrections to plan: The pair of single 6-in. guns at upper deck level aft are removed in Marblehead, Cincinnati, Detroit, Raleigh and Richmond. In Marblehead there is a single gun on top of the after battery.

UNITED STATES.

AIRCRAFT CARRIERS.

Lexington. **Saratoga.**



Length (extreme), Lexington, 880 ft. ; Saratoga, 888 ft. ; 33,000 tons ; Speed, 33¼ knots ; Completed, 1927.
Armament, 8—8-in. ; 12—5-in. A.A. ; 4—6-pr. ; Operate about 80 aircraft.

PROFILES OF MERCHANT SHIPS.

MERCHANT SHIPS.

AQUITANIA. Cunard. Length, 868 ft. 7 ins.; Gross Tonnage, 45,647; Funnels: Red, Black Tops.

OLYMPIC. White Star. Length, 852 ft. 5 ins.; Gross Tonnage, 46,439; Funnels: Buff, Black Tops.

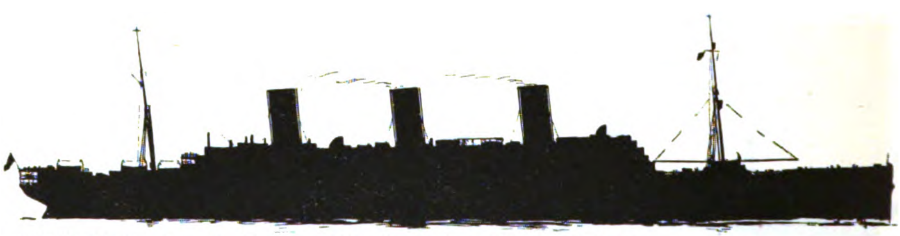
MAURETANIA. Cunard. Length, 762 ft. 2 ins.; Gross Tonnage, 30,696; Funnels: Red, Black Tops.

FRANCE. Cie. Générale Transatlantique. Length, 690 ft. 1 in.; Gross Tonnage, 23,769; Funnels: Red, Black Tops.

ARUNDEL CASTLE. WINDSOR CASTLE. Union Castle. Length, 630 ft. 5 ins. and 632 ft. 4 ins.; Gross Tonnage, 19,020 and 18,973; Funnels: Red, Black Tops.

MAJESTIC. **White Star.** Length, 915 ft. 5 ins.; Gross Tonnage, 56,621; Funnels: Buff, Black Tops.

LEVIATHAN. **United States Lines.** Length, 907 ft. 6 ins.; Gross Tonnage, 48,943; Funnels: Red, White Band, Blue Tops.

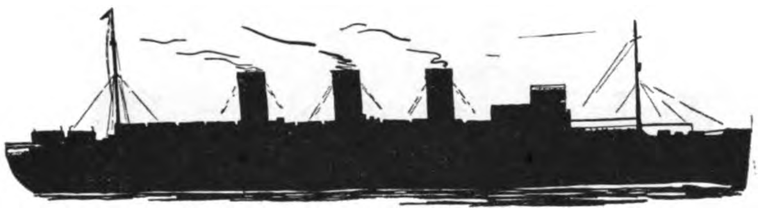


BERENGARIA. **Cunard.** Length, 883 ft. 6 ins.; Gross Tonnage, 52,101; Funnels: Red, Black Tops.

ILE DE FRANCE. **Cie. Générale Transatlantique.** Length, 763 ft. 7 ins.; Gross Tonnage, 43,153; Funnels: Red, Black Tops.

PARIS. **Cie. Générale Transatlantique.** Length, 735 ft. 4 ins.; Gross Tonnage, 34,569; Funnels: Red, Black Tops.

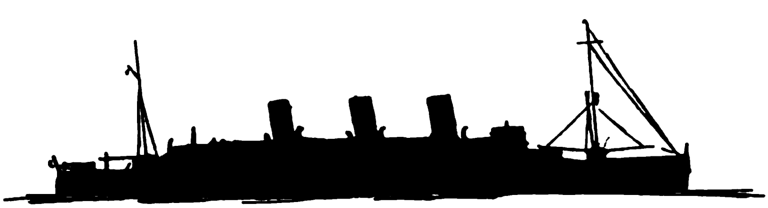
EMPRESS OF BRITAIN. **Canadian Pacific.** Length, 733 ft. 3 ins.;
Gross Tonnage, 42,348;
Funnels: Yellow.



L'ATLANTIQUE. **Cie. Sud Atlantique.** Length, 713 ft. 6 ins.;
Gross Tonnage, 42,512;
Funnels: Buff, Black Tops.
(*Gutted by fire on January* 5, 1933.)

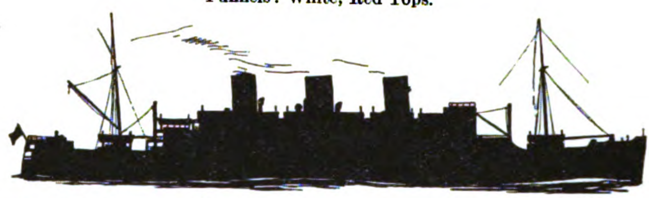
BELGENLAND. **Red Star.** Length, 670 ft. 4 ins.; Gross Tonnage, 27,132;
Funnels: Black, White Band.

STATENDAM. **Holland-Amerika.** Length, 674 ft. 2 ins.; Gross Tonnage, 28,291;
Funnels: Buff, White Band between Two Green.



EMPRESS OF JAPAN. **Canadian Pacific.** Length, 644 ft. Gross Tonnage, 26,032;
Funnels, Buff.

CAP ARCONA. **Hamburg-South Amerika Line.** Length, 643 ft. 6 ins.; Gross Tonnage, 27,561; Funnels: White, Red Tops.

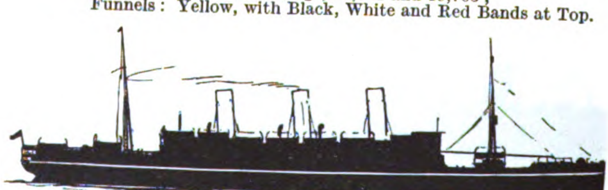


STRATHNAVER. STRATHAIRD. **Peninsular and Oriental.** Length, 638 ft. 7 ins. and 638 ft.; Gross Tonnage, 22,547 and 22,544; Funnels: Yellow. Hulls: White.

CAP POLONIO. **Hamburg-South Amerika.** Length, 637 ft. 8 ins.; Gross Tonnage, 21,011; Funnels: White, Red Tops.

EMPRESS OF CANADA. **Canadian Pacific.** Length, 627 ft.; Gross Tonnage, 21,517; Funnels: Yellow.

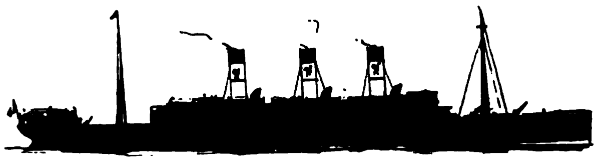
RELIANCE. RESOLUTE. **Hamburg-Amerika Line.** Length, 590 ft. 4 ins.; Gross Tonnage, 19,821 and 19,703; Funnels: Yellow, with Black, White and Red Bands at Top.



EMPRESS OF AUSTRALIA. **Canadian Pacific.** Length, 589 ft. 9 ins.; Gross Tonnage, 21,833; Funnels: Yellow.

NALDERA. **Peninsular and Oriental.** Length, 580 ft. 9 ins.; Gross Tonnage, 16,088;
NARKUNDA. ,, ,, ,, Length, 581 ft. 4 ins.; Gross Tonnage, 16,572;
Funnels: Black.

(The Narkunda is similar to the Naldera but has raised forecastle.)



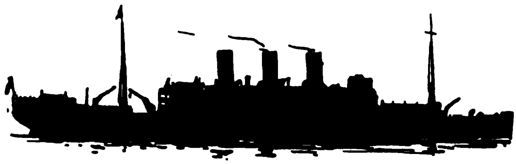
LUTETIA. **Cie. Sud Atlantique.** Length, 579 ft.; Gross Tonnage, 14,783;
Funnels: Buff, Black Tops.

MASSILIA. **Cie. Sud Atlantique.** Length, 577 ft. 1 in.; Gross Tonnage, 15,363;
Funnels: Buff, Black Tops.

EMPRESS OF ASIA. **EMPRESS OF RUSSIA.** **Canadian Pacific.**
Length, 570 ft.; Gross Tonnage, 16,909 and 16,810;
Funnels: Yellow.

MONARCH OF BERMUDA. **QUEEN OF BERMUDA.** **Furness Withy.**
Length, 553 ft. 4 ins.; Gross Tonnage, 22,424 and 22,575;
Funnels: Black, Red, Thin Black and Red Bands, Black Tops.

TRANSYLVANIA. **CALEDONIA.** **Anchor Henderson.**
Length, 552 ft. 4 ins. and 553 ft.; Gross Tonnage, 16,923 and 17,046;
Funnels: Black.



CHAMPOLLION. MARIETTE PACHA. Messageries Maritimes.
Length, 495 ft. 1 in. and 508 ft. 5 ins.; Gross Tonnage, 12,263 and 12,239;
Funnels: Black.

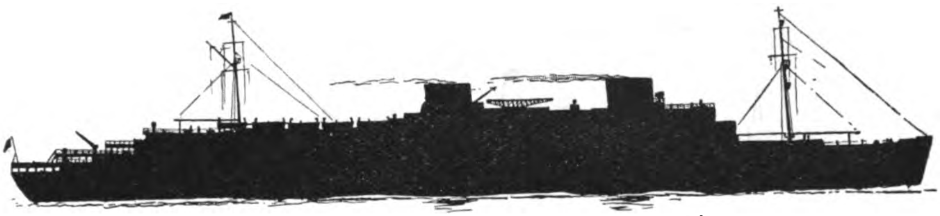
TAIREA. TAKLIWA. TALAMBA. British India S.N. Co.
Length, 449 ft. 6 ins.; Gross Tonnage, 8,000;
Funnels: Black, Two White Bands, Black Tops.

PRINCE DAVID. PRINCE HENRY. PRINCE ROBERT. Canadian National Railways.
Length, 366 ft. 4 ins.; Gross Tonnage, 6,892.

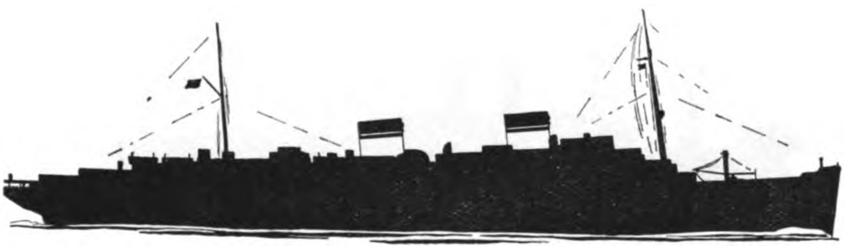
PRINCESS KATHLEEN. PRINCESS MARGUERITE. Canadian Pacific.
Length, 350 ft.; Gross Tonnage, 5,875;
Funnels: Yellow, Black Top.

CIUDAD DE BUENOS AIRES. Argentine S.N. Co. **CIUDAD DE MONTE VIDEO.**
Uruguayan S.N. Co. Length, 350 ft.; Gross Tonnage, 3,864;
Funnels: Yellow, Black Tops.

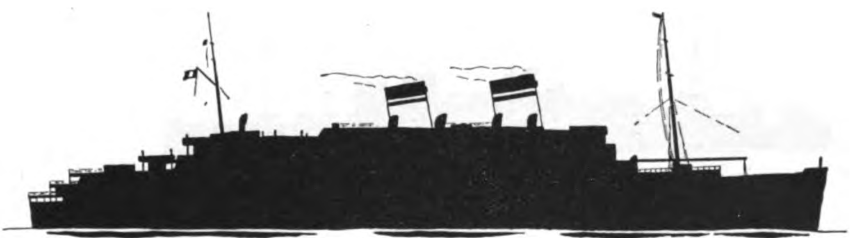
PRINCESS ELAINE. Canadian Pacific. Length 291 ft.; Gross Tonnage, 2,000;
Funnels: Yellow, Black Top.



BREMEN. EUROPA. Norddeutscher Lloyd. Length, 898 ft. 7 ins. and 890 ft. 2 ins.; Gross Tonnage, 51,656 and 49,746; Funnels: Yellow.



REX. Italia Line. Length, 833 ft. 8 ins.; Gross Tonnage, 50,100; Funnels: Red, White and Green Stripes.



CONTE DI SAVOIA. Italia Line. Length, 814 ft. 6 ins.; Gross Tonnage, 48,502; Funnels: Red, White and Green Stripes.

HOMERIC. White Star. Length, 751 ft.; Gross Tonnage, 34,351; Funnels: Buff, Black Tops.

COLUMBUS. Norddeutscher Lloyd. Length, 749 ft. 6 ins. Gross Tonnage, 32,565; Funnels: Yellow.

ADRIATIC. White Star. Length, 709 ft. 2 ins.;
Gross Tonnage, 24,679;
Funnels: Buff, Black Tops.

GEORGE WASHINGTON. United States Shipping Board. Length, 699 ft. 1 in.;
Gross Tonnage, 23,788;
Funnels: Red, White Band, Blue Top.

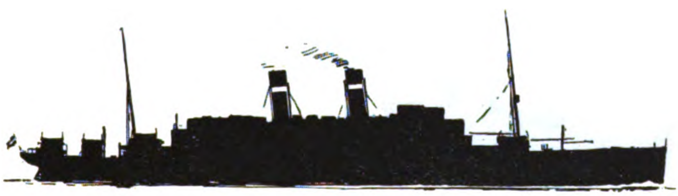
M.S. BRITANNIC. M.S. GEORGIC. White Star. Length, 683 ft. 6 ins.; Gross Tonnage,
26,943 and 27,759;
Funnels: Buff, Black Tops.

MANHATTAN. WASHINGTON. United States Lines. Length, 668 ft. 4 ins.;
Gross Tonnage, 24,289;
Funnels: Red, White Band, Blue Tops.

M.S. AUGUSTUS. Italia Line. Length, 710 ft. 9 ins.;
Gross Tonnage, 30,418;
Funnels: Red, White and Green Stripes.

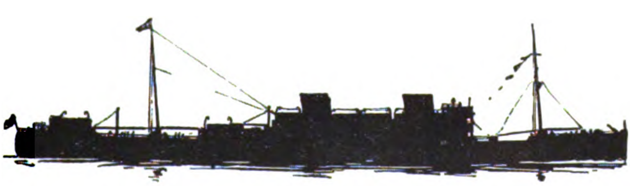
ROMA. Italia Line. Length, 664 ft. 7 ins.; Gross Tonnage, 32,583; Funnels: Red, White and Green Stripes.

CONTE GRANDE. CONTE BIANCAMANO. Italia Line. Length, 652 ft. 2 ins. and 650 ft. 9 ins.; Gross Tonnage, 25,661 and 24,416; Funnels: Red, White and Green Stripes.



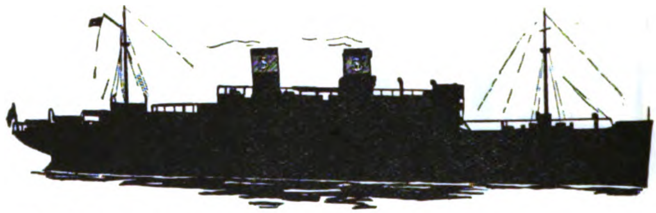
ROTTERDAM. Holland-Amerika. Length, 650 ft. 5 ins.; Gross Tonnage, 24,149; Funnels: Buff, Two Green Bands with White Band between, Buff Tops.

ORFORD. ORAMA. ORONSAY. ORONTES. OTRANTO. Orient. Length, 632 ft.; Gross Tonnage, about 20,000; Funnels: Cream.



M.S. WARWICK CASTLE. M.S. WINCHESTER CASTLE. M.S. CARNARVON CASTLE. Union Castle Line. Length, 651 ft. 5 ins., 631 ft. 6 ins., and 630 ft. 7 ins.; Gross Tonnage, 20,445, 20,109, and 20,063; Funnels: Red, Black Tops.

ALCANTARA. ASTURIAS. Royal Mail.
Length, 630 ft. 5 ins.; Gross Tonnage, 22,181 and 22,071;
Funnels: Buff.



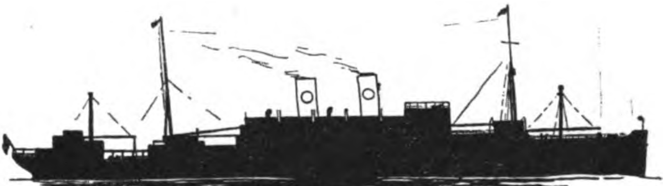
PRESIDENT HOOVER. PRESIDENT COOLIDGE. Dollar Steamship Lines.
Length, 615 ft.; Gross Tonnage, 21,936;
Funnels: Black, White $ on Red Band.

ALBERT BALLIN. DEUTSCHLAND. Hamburg-Amerika Line. Length, 602 ft. 4 ins.;
Gross Tonnage, 20,931 and 20,742;
Funnels: Yellow, with Black, White and Red Band at Tops.

NEW YORK. HAMBURG. Hamburg-Amerika Line. Length, 602 ft. 5 ins.;
Gross Tonnage, 21,867 and 21,691;
Funnels: Yellow, with Black, White and Red Band at Tops.

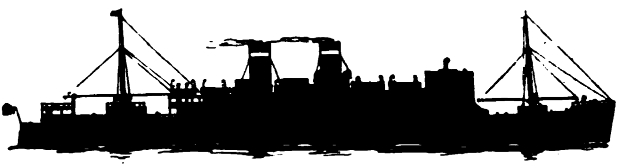
DUILIO. GIULIO CESARE. Italia Line. Length, 602 ft. 4 ins.;
Gross Tonnage, 24,281 and 21,782;
Funnels: Red, White and Green Stripes.

MOOLTAN. MALOJA. Peninsular and Oriental. Length, 600 ft. 8 ins.;
Gross Tonnage, 20,952 and 20,914;
Funnels: Black.



M.S. KUNGSHOLM. Swedish American Line. Length, 594 ft. 9 ins.;
Gross Tonnage, 20,223;
Funnels: Yellow, Blue Discs on Sides.

ALBERTIC. White Star. Length, 590 ft. 8 ins.; Gross Tonnage, 18,940;
Funnels: Buff, Black Tops.



VIRGINIA. PENNSYLVANIA. CALIFORNIA. American S.S. Corporation.
Length, 586 ft. 4 ins., 586 ft. 4 ins., and 574 ft. 4 ins.;
Gross Tonnage, 18,298, 18,200, and 17,817;
Funnels: Black, White Band.

VICEROY OF INDIA. Peninsular and Oriental. Length, 582 ft. 7 ins.;
Gross Tonnage: 19,648;
Funnels: Black.

DUCHESS OF ATHOLL. DUCHESS OF BEDFORD. DUCHESS OF RICHMOND. DUCHESS OF YORK. Canadian Pacific. Length, 581 ft. 9 ins.;
Gross Tonnage, 20,123 to 20,021;
Funnels Yellow.

ORMONDE. **Orient Line.** Length, 580 ft. 5 ins.; Gross Tonnage, 14,982; Funnels: Cream.

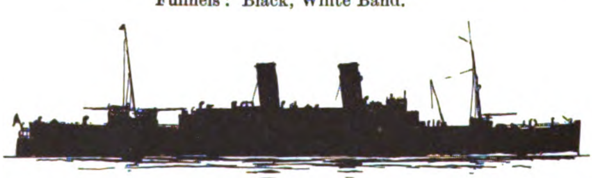
M.S. AORANGI. **Canadian-Australasian Line.** Length, 580 ft.; Gross Tonnage, 17,491; Funnels: Red, Black Tops.

M.S. MARNIX VAN ST. ALDEGONDE. **M.S. JOHAN VAN OLDENBARNEVELT.** **Stoomvaat Maatschappji Nederland.** Length, 580 ft.; Gross Tonnage, 19,129 and 19,040; Funnels: Buff, Black Tops.

LAURENTIC. **White Star.** Length, 578 ft. 2 in.; Gross Tonnage, 18,724; Funnels: Buff, Black Tops.

DORIC. **White Star.** Length, 575 ft. 5 ins.; Gross Tonnage, 16,484; Funnels: Buff, Black Tops.

WESTERNLAND. **PENNLAND.** **Red Star.** Length, 575 ft. 3 ins.; Gross Tonnage, 16,500 and 16,322; Funnels: Black, White Band.



EMPRESS OF FRANCE. **Canadian Pacific.** Length, 571 ft. 4 ins.; Gross Tonnage, 18,452; Funnels: Yellow.

SAXON. **Union Castle Line.** Length, 570 ft. 5 ins.; Gross Tonnage, 12,885; Funnels: Red, Black Tops.

CONTE VERDE. **CONTE ROSSO.** **Italia Line.** Length, 570 ft. 2 ins. and 530 ft. 7 ins.; Gross Tonnage, 18,765 and 17,856; Funnels: Red, White and Green Stripes.

ARMADALE CASTLE. **KENILWORTH CASTLE.** **Union Castle Line.** Length, 570 ft. 1 in.; Gross Tonnage, 12,973 and 12,999; Funnels: Red, Black Tops.

BALMORAL CASTLE. **EDINBURGH CASTLE.** **Union Castle Line.** Length, 570 ft.; Gross Tonnage, 13,363 and 13,329; Funnels: Red, Black Tops.

M.S. CHICHIBU MARU. **M.S. TATSUTA MARU.** **M.S. ASAMA MARU.** **Nippon Yusen Kaisha.** Length, 560 ft.; Gross Tonnage, 17,498 to 16,975; Funnels: Black, Broad White Band, Two Red on White.

ROCHAMBEAU. **Cie. Générale Transatlantique.** Length, 559 ft. 4 ins.; Gross Tonnage, 12,678 Funnels: Red, Black Tops.

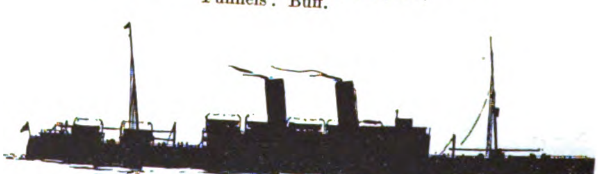
SHINYO MARU. **Nippon Yusen Kaisha.** Length, 558 ft.; Gross Tonnage, 13,026;
Funnels: Black, Broad White Band, Two Red on White.

MALOLO. **Matson Line.** Length, 554 ft.; Gross Tonnage, 17,232;
Funnels: Yellow, Black Tops, "M" on sides.

M.S. GRIPSHOLM. **Swedish American Line.** Length, 553 ft.; Gross Tonnage, 17,544;
Funnels: Yellow, Blue Discs on Sides.

DE GRASSE. **Cie. Générale Transatlantique.** Length, 552 ft. 1 in.; Gross Tonnage, 18,435;
Funnels: Red, Black Tops.

M.S. REINA DEL PACIFICO. **Pacific Steam Navigation Co.**
Length, 551 ft.; Gross Tonnage, 17,707;
Funnels: Buff.

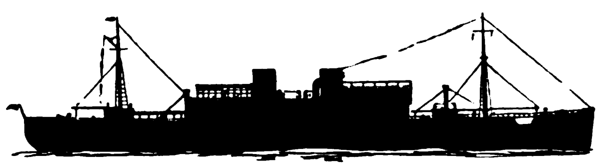


VEENDAM. **VOLENDAM.** **Holland-Amerika Line.** Length, 550 ft. 2 ins.;
Gross Tonnage, 15,450 and 15,434;
Funnels: Buff, White Band between Two Green.

DRESDEN. Norddeutscher Lloyd. Length, 550 ft.; Gross Tonnage, 14,690; Funnels: Yellow.

MONTCALM. MONTCLARE. MONTROSE. Canadian Pacific. Length, 549 ft. 5 ins.; Gross Tonnage, 16,418 to 16,314; Funnels: Yellow.

RANCHI. RAWALPINDI. RANPURA. RAJPUTANA. Peninsular and Oriental. Length, 548 ft.; Gross Tonnage, 16,738 to 16,644; Funnels: Black.



M.S. ST. LOUIS. M.S. MILWAUKEE. Hamburg-Amerika. Length, 543 ft. 8 ins. and 546 ft. 6 ins.; Gross Tonnage, 16,712 and 16,699; Funnels: Yellow, with Black, White and Red Bands at Tops.

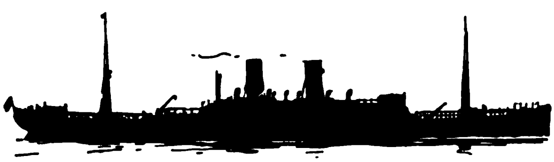
D'ARTAGNAN. Messageries Maritimes. Length, 543 ft. 5 ins.; Gross Tonnage, 15,105; Funnels: Black.

M.S. ARAMIS. Messageries Maritimes. Length, 543 ft. 5 ins.; Gross Tonnage, 15,537; Funnels: Black.

GELRIA. **Holland Lloyd.** Length, 541 ft.; Gross Tonnage, 13,868; Funnels: Yellow, Black Band.

M.S. VICTORIA. **Lloyd Triestino.** Length, 540 ft. 6 ins.; Gross Tonnage, 13,068; Funnels: Black.

MANTUA. **Peninsular and Oriental.** Length, 540 ft.; Gross Tonnage, 10,946; Funnels: Black.

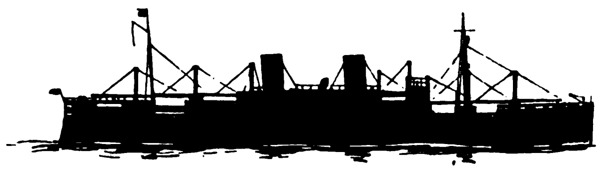


NIEUW ZEELAND. NIEUW HOLLAND. **Koninklijke Paketvaart Maatschappij.** Length, 540 ft.; Gross Tonnage, 11,060 and 11,057; Funnels: Buff, narrow Black Top.

ORSOVA. **Orient Line.** Length, 536 ft. 2 ins.; Gross Tonnage, 12,041; Funnels: Cream.

M.S. FÉLIX ROUSSEL. **Messageries Maritimes.** Length, 534 ft. 8 ins.; Gross Tonnage, 16,741; Funnels: Black.

STAVANGERFJORD. Norske Amerika Linie. Length, 532 ft. 5 ins.; Gross Tonnage, 13,156; Funnels: Yellow, Two Red and Two White Bands with Blue Band between.

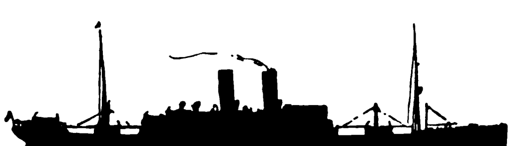


M.S. RANGITATA. RANGITANE. RANGITIKI. New Zealand Shipping Co.
Length, 531 ft.; Gross Tonnage, 16,737, 16,712, and 16,698;
Funnels: Yellow.

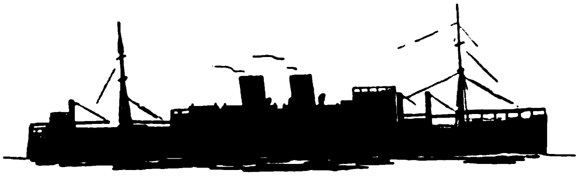
CHITRAL. COMORIN. CATHAY. Peninsular and Oriental.
Length, 526 ft. 3 in., 523 ft. 5 ins., and 523 ft. 5 ins. Gross Tonnage, 15,396, 15,279, and 15,272;
Funnels: Black.

NIAGARA. Canadian-Australasian Line. Length, 524 ft. 7 ins.; Gross Tonnage, 13,415;
Funnels: Red, Black Tops.

M.S. HIGHLAND MONARCH. HIGHLAND CHIEFTAIN. HIGHLAND BRIGADE. HIGHLAND PRINCESS. HIGHLAND PATRIOT. Royal Mail (Nelson).
Length, 523 ft. 4 ins.; Gross Tonnage, 14,157 to 14,128;
Funnels: Cream.



FREDERIK VIII. Det Forenede Damskibs Selskab. Length, 523 ft. 5 ins.;
Gross Tonnage, 11,850;
Funnels: Black, Red Band.

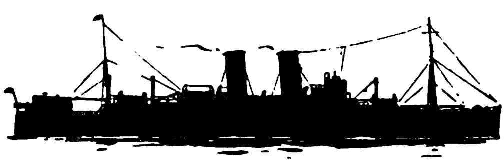


CORFU. CARTHAGE. Peninsular and Oriental. Length, 522 ft. 5 ins.; Gross Tonnage, 14,293 and 14,304; Funnels: Black.

KAISAR-I-HIND. Peninsular and Oriental. Length, 520 ft.; Gross Tonnage, 11,518; Funnels: Black.

MINNEDOSA. MELITA. Canadian Pacific. Length, 520 ft.; Gross Tonnage, 15,186; and 15,183; Funnels: Yellow.

BERGENSFJORD. Norske Amerika Line. Length, 512 ft. 4 ins.; Gross Tonnage, 11,015; Funnels: Yellow, Two Red and Two White Bands with Blue Band between.



ARANDORA STAR. Blue Star Line. Length, 512 ft. 2 ins.; Gross Tonnage, 14,694; Funnels: Red, Black Tops and White Band, Blue Star on White Disc.

AVELONA STAR. AVILA STAR. ALMEDA STAR. ANDALUCIA STAR. Blue Star Line. Length, 510 ft. 2 ins. to 512 ft. 2 ins.; Gross Tonnage, 13,376 to 12,846; Funnels: Red, Black Tops and White Band, Blue Star on White Disc.

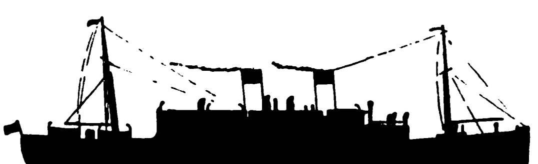
PORTHOS. **Messageries Maritimes.** Length, 510 ft. 8 ins.; Gross Tonnage, 12,692; Funnels: Black.

ANDRE LEBON. **Messageries Maritimes.** Length, 508 ft. 2 ins.; Gross Tonnage, 13,682; Funnels: Black.

GUADELOUPE. **Cie. Générale Transatlantique.** Length, 508 ft. 4 ins.; Gross Tonnage, 10,502; Funnels: Red, Black Tops.

METAGAMA. **Canadian Pacific.** Length, 500 ft. 4 ins.; Gross Tonnage, 12,420; Funnels: Yellow.

MONOWAI. **Union Royal Mail Line.** Length, 500 ft. 4 ins.; Gross Tonnage, 10,852; Funnels: Red, Black Tops.



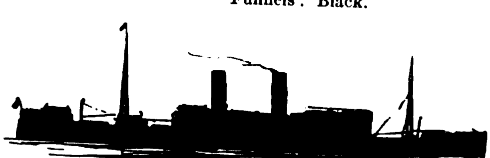
M.S. MONTE ROSA. **M.S. MONTE PASCOAL.** **Hamburg-Sud Amerika Line.** Length, 500 ft. 3 in.; Gross Tonnage, 13,882 and 13,870; Funnels: White, Red Tops.

M.S. GENERAL OSORIO. **Hamburg-Amerika Line.** Length, 498 ft. 5 ins.; Gross Tonnage, 11,590; Funnels: Yellow, with Black, White, and Red Band at Tops.

ALBERTVILLE. **Lloyd Royal Belge.** Length, 494 ft.; Gross Tonnage, 10,769; Funnels: Yellow.

M.S. LLANGIBBY CASTLE. **Union Castle Line.** Length, 486 ft.; Gross Tonnage, 11,951; Funnels: Red, Black Tops.

M.S. CABO SAN AGUSTIN. **Ybarra & Co.** Length, 482 ft. 5 ins.; Gross Tonnage, 11,868; Funnels: Black.



PATRIA. **Rotterdam Lloyd (Wm. Ruys & Zonen).** Length, 480 ft.; Gross Tonnage, 9,891 Funnels: Black.

SPHINX. **Messageries Maritimes.** Length, 478 ft.; Gross Tonnage, 11,375; Funnels: Black.

LEOPOLDVILLE. **Lloyd Royal Belge.** Length, 478 ft. 8 ins.; Gross Tonnage, 11,256; Funnels: Yellow.

GANGE. **Lloyd Triestino.** Length, 477 ft. 5 ins.; Gross Tonnage, 12,272; Funnels: Black.

CUBA. **Cie. Générale Transatlantique.** Length, 476 ft.; Gross Tonnage, 11,357; Funnels: Red, Black Tops.

FLORIDA. **Société Générale de Transports Maritimes à Vapeur.** Length, 471 ft. 2½ ins.; Gross Tonnage, 9,149; Funnels: Black, Red Band.

M.S. DUNBAR CASTLE. **Union Castle Line.** Length, 471 ft. 2 ins.; Gross Tonnage, 10,002; Funnels: Red, Black Tops.

M.S. EUROPA. **East Asiatic Co.** Length, 465 ft. 4 ins.; Gross Tonnage, 10,224; Funnels: Yellow.

M.S. AMERIKA. **East Asiatic Co.** Length, 465 ft. 4 ins.; Gross Tonnage, 10,110; Funnels: Yellow.

M.S. JEAN LABORDE. **Messageries Maritimes.** Length, 463 ft. 6 ins.; Gross Tonnage, 11,414; Funnels: Black.

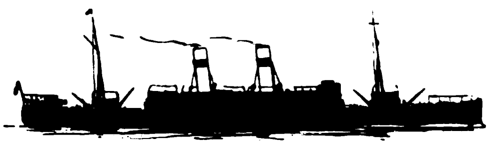
M.S. WENATCHEE STAR. **M.S. YAKIMA STAR.** **Blue Star Line.** Length, 460 ft. 4 ins.; Gross Tonnage, 6,607; Funnels: Red, Black Top and White Band, Blue Star on White Disc.

M.S. WANGANELLA. **Huddart, Parker.** Length, 461 ft. 2 ins.; Gross Tonnage, 9,576; Funnels: Yellow.

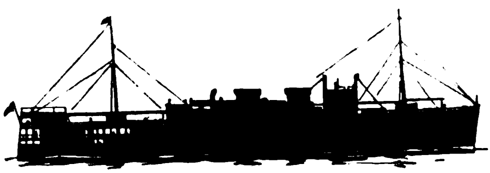
MARTHA WASHINGTON. **Cosulich Line.** Length, 459 ft.; Gross Tonnage, 8,347; Funnels: Red, White Band, Black Tops.

M.S. MAGDALENA. **M.S. ORINOCO.** **Hamburg-Amerika.** Length, 456 ft. 8 ins.; Gross Tonnage, 9,540; Funnels: Yellow, with Black, White, and Red Band at Tops.

TILAWA. TALMA. British India S.N. Co. Length, 451 ft.; Gross Tonnage, 10,006 and 10,000; Funnels: Black, Two White Bands, Black Tops.



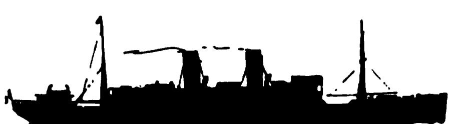
FLANDRIA. ORANIA. Holland Lloyd. Length, 450 ft.; Gross Tonnage, 10,171 and 9,763; Funnels: Yellow, Black Band.



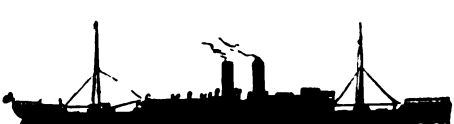
M.S. ERIDAN. Messageries Maritimes. Length, 445 ft. 4 ins.; Gross Tonnage, 9,928; Funnels: Black.

DE LA SALLE. Cie. Générale Transatlantique. Length, 440 ft.; Gross Tonnage, 8,400; Funnels: Red, Black Tops.

SINAIA. Cyp. Fabre. Length, 440 ft.; Gross Tonnage, 8,666.



ASIE. Chargeurs Réunis. Length, 439 ft. 3 ins.; Gross Tonnage, 8,561; Funnels: Yellow, Red Stars on White Band.



PEROU. Cie. Générale Transatlantique. Length, 432 ft. 5 ins.; Gross Tonnage, 6,599; Funnels: Red, Black Tops.

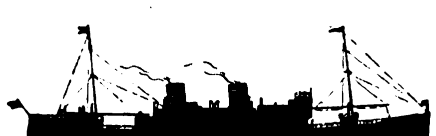
M.S. THÉOPHILE GAUTIER. Messageries Maritimes. Length, 425 ft.; Gross Tonnage, 9,000; Funnels: Black.

SIMON BOLIVAR. Royal Nederlands Line. Length, 420 ft.; Gross Tonnage, 7,906; Funnels: Black, Two White Bands.

M.S. RIO BRAVO. M.S. RIO PANUCO. Flensburger Dampfer Co. (H. Schuldt). Length, 410 ft.; Gross Tonnage, 5,945; Funnels; Black, Blue Band, White Diamond with Red S.

RANGATIRA. Union Steamship Company of N.Z. Length, 406 ft. 1½in.; Gross Tonnage, 6.152; Funnels: Red, Black Tops.

NAGASAKI MARU. SHANGHAI MARU. Nippon Yusen Kaisha. Length, 402 ft.; Gross Tonnage, 5,272; Funnels: Black, White Band.



M.S. VENUS. Bergen Steamship Co. Length, 398 ft. 5 ins.; Gross Tonnage, 5,407; Funnels: Black, Three White Rings.

KEIFUKU MARU. **Imperial Japanese Railway.** Length, 385 ft.; Gross Tonnage, 5,831: Funnels: Yellow, Black Top, Red I on Yellow.

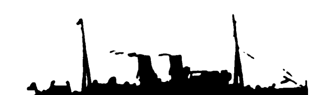
ANGLIA. CAMBRIA. HIBERNIA. SCOTIA. L.M.S. Railway. Length, 380 ft. 5 ins.; Gross Tonnage, 3,460; Funnels: Yellow, Black Tops.

VIENNA. AMSTERDAM. PRAGUE. London and North Eastern Railway. Length, 350 ft.; Gross Tonnage, 4,218; Funnels; Yellow, Black Tops.

DUKE OF ARGYLL. DUKE OF LANCASTER. DUKE OF ROTHESAY. London, Midland and Scottish Railway. Length, 349 ft.; Gross Tonnage, 3,608; Funnels: Yellow, Black Tops.

M.S. ULSTER MONARCH. ULSTER QUEEN. ULSTER PRINCE. Ulster Imperial Line. Length 346 ft.; Gross Tonnage, 3,759; Funnels: Red, Black Top.

ANTWERP. MALINES. BRUGES. London and North Eastern Railway. Length, 321 ft. 6 ins.; Gross Tonnage, 2,957; Funnels: Yellow, Black Tops.



HANTONIA. NORMANNIA. Southern Railway. Length, 290 ft. 3 ins.; Gross Tonnage, 1,567; Funnels: Buff.

DIEPPE. Southern Railway. Length, 273 ft. 5 ins.; Gross Tonnage, 1,228; Funnels: White, Black Tops.

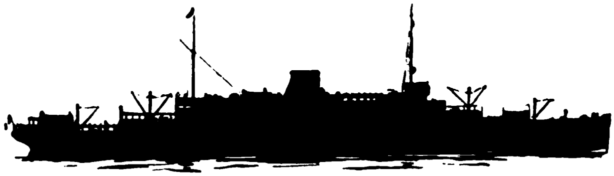
CERAMIC. White Star Line. Length, 655 ft. 1 in.; Gross Tonnage, 18,495;
Funnel: Buff, Black Top.

CHAMPLAIN. Cie. Générale Transatlantique. Length, 607 ft.; Gross Tonnage, 28,912;
Funnel: Red, Black Top.

CARINTHIA. FRANCONIA. Cunard. Length, 600 ft. 7 ins. and 601 ft. 3 ins.;
Gross Tonnage, 20,277 and 20,175;
Funnel: Red, Black Top.

SCYTHIA. LACONIA. SAMARIA. Cunard. Length, 601 ft.;
Gross Tonnage, 19,761, 19,695, and 19,597;
Funnel: Red, Black Top.

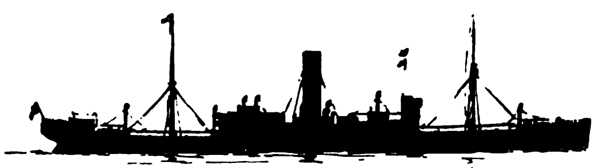
MINNETONKA. MINNEWASKA. Atlantic Transport. Length, 600 ft. 8 ins.;
Gross Tonnage, 21,998 and 21,716;
Funnel: Red, Black Top.



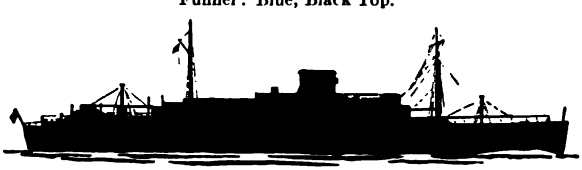
M.S. VULCANIA. M.S. SATURNIA. Cosulich Line. Length, 631 ft. 4 ins.; Gross Tonnage, 23,970 and 23,940; Funnel: Red, White Band and Black Top.

M.S. LAFAYETTE. Cie. Générale Transatlantique. Length, 577 ft. 2 ins.; Gross Tonnage, 25,178; Funnel: Red, Black Top.

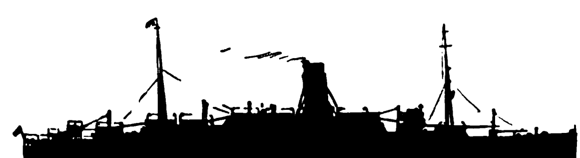
ALMANZORA. ATLANTIS. ARLANZA. Royal Mail. Length, 570 ft.; Gross tonnage, 15,551 to 14,622; Funnel: Buff.



ULYSSES. NESTOR. Blue Funnel Line. Length, 563 ft. 2 ins.; Gross Tonnage, 14,652 and 14,629; Funnel: Blue, Black Top.



M.S. NEPTUNIA. M.S. OCEANIA. Cosulich Line. Length, 589 ft. 7 ins. Gross Tonnage, 19,475 and 19,507; Funnel: Red, White Band and Black Top.

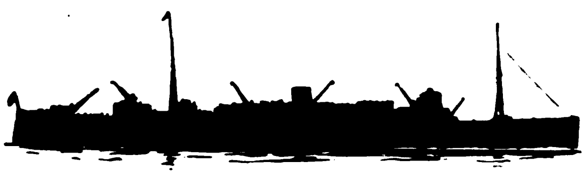


TUSCANIA. CALIFORNIA. Anchor. Length, 553 ft.; Gross Tonnage, 16,991 and 16,792; Funnel: Black.

LANCASTRIA. **Cunard.** Length, 552 ft. 8 ins. Gross Tonnage, 16,243 ; Funnel ; Red, Black Top.

CAMERONIA. **Anchor.** Length, 552 ft. 4 ins. ; Gross Tonnage, 16,297 ; Funnel : Black.

MONGOLIA. **MOLDAVIA.** **Peninsular and Oriental.** Length, 551 ft. 6 ins. and 552 ft. 4 ins. ; Gross Tonnage, 16,596 and 16,556 ; Funnel : Black.



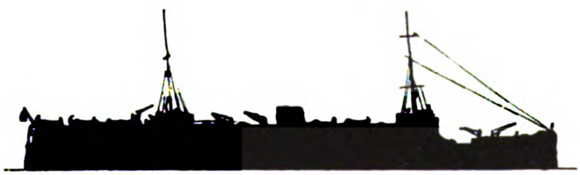
M.S. CHRISTIAAN HUYGENS. **Stoomvaart Maatschappij Nederland.** Length, 551 ft. 5 ins. ; Gross Tonnage, 15,704 ; Funnels : Buff, Black Top.

AKAROA. **Shaw, Savill and Albion.** Length, 550 ft. 7 ins. ; Gross Tonnage, 15,128 ; Funnel : Buff, Black Top.

ORDUNA. **Pacific Steam Navigation Co.** Length, 550 ft. 3 ins. ; Gross Tonnage, 15,507 ; Funnel : Buff.

ORBITA. **Pacific Steam Navigation Co.** Length, 550 ft. 3 ins.; Gross Tonnage, 15,495; Funnel; Buff.

CALGARIC. **White Star.** Length, 550 ft. 3 ins.; Gross Tonnage, 16,063; Funnel: Buff, Black Top.

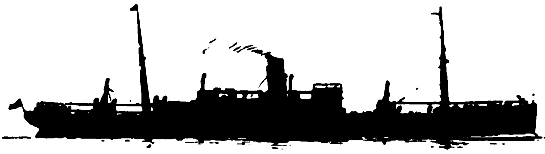


M.S. BALOERAN. **Rotterdam Lloyd.** Length, 550 ft.; Gross Tonnage, 16,981; Funnel: Black.

M.S. DEMPO. **Rotterdam Lloyd.** Length, 550 ft.; Gross Tonnage, 16,979; Funnel: Black.

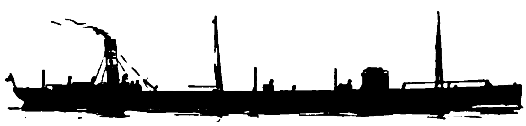
BETHORE. **Ore Steamship Co., N.Y.** Length, 550 ft.; Gross Tonnage, 8,257; Funnel: Grey, Blue and White Bands, White O.

M.S. SIR JAMES CLARK ROSS. **Hvalfanger A/S Rosshavet.** Length, 537 ft. 9 ins.; Gross Tonnage, 14,362.



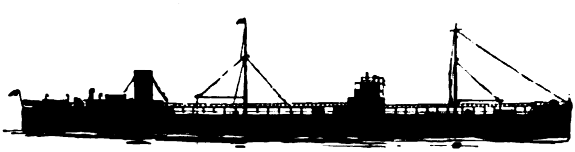
HOBSONS BAY. LARGS BAY. ESPERANCE BAY. JERVIS BAY. MORETON BAY.
Aberdeen Commonwealth Line. Length, 530 ft.; Gross Tonnage, 14,198 to 14,145;
Funnel: Yellow.

OROPESA. Pacific Steam Navigation Co. Length, 530 ft.; Gross Tonnage, 14,075;
Funnel: Buff.

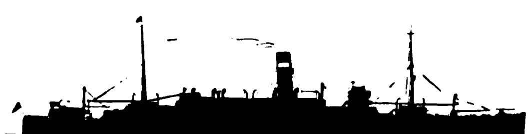


SAN MELITO. Eagle Oil Transport Co. Length, 530 ft.; Gross Tonnage, 12,286;
Funnel: Black, Yellow Band, Black Eagle, Black O on White Band, Yellow Band.

CADILLAC. SARANAC. Anglo American Oil Co. Length, 530 ft. 2 ins.;
Gross Tonnage, 12,076 and 12,074;
Funnel: Red, Black Top.

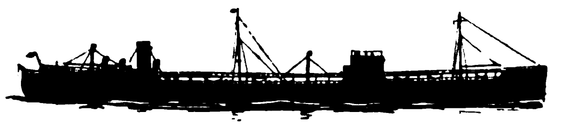


M.S. ATHELCROWN. United Molasses Co. Length, 526 ft. 5 ins.; Gross Tonnage, 11,999;
Funnel: Red, B.M.Co. on White Diamond, Black Top.

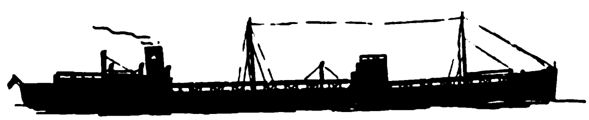


LETITIA. ATHENIA. Anchor-Donaldson. Length, 525 ft. 7 ins. and 526 ft. 8 ins.;
Gross Tonnage, 13,475 and 13,465;
Funnel: Black, White Band, Black Top.

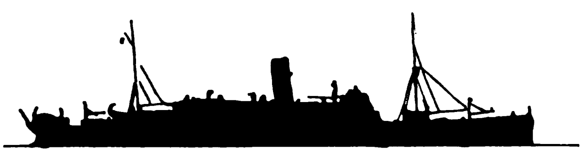
OROYA. Pacific Steam Navigation Co. Length, 525 ft. 3 ins. Gross Tonnage, 12,257; Funnel: Buff.



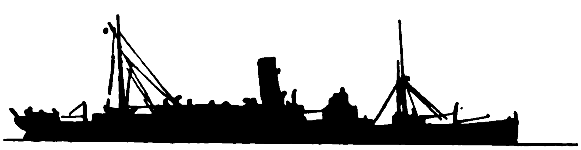
CALGAROLITE. Imperial Oil Co. Length, 522 ft.; Gross Tonnage, 11,941; Funnel: Black, Blue Band between Two White, Black Top.



M.S. F. H. BEDFORD, JUNR. Baltisch Amer. Petrol. Import. Length, 521 ft. 4 ins.; Gross Tonnage. 11,952.



ALAUNIA. ASCANIA. AURANIA. Cunard Line. Length, 520 ft.; Gross Tonnage, 14,030 to 13,984; Funnel; Red, Black Top.

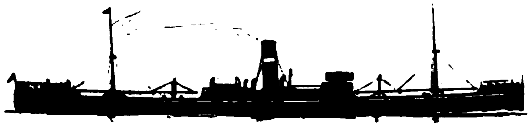


ANDANIA. AUSONIA. ANTONIA. Cunard Line. Length, 520 ft.; Gross Tonnage, 13,950 to 13,867; Funnel: Red, Black Top.

BARADINE. BARRABOOL. BALLARAT. BALRANALD. BENDIGO. Peninsular and Oriental. Length, 519 ft. 9 ins.; Gross Tonnage, 13,072 to 12,972; Funnel: Black.

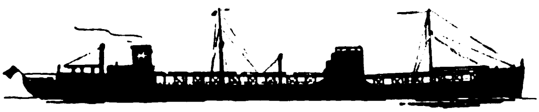
MANGALORE. MATHURA. Brocklebank. Length, 518 ft.; Gross Tonnage, 9,571 and 9,743; Funnel: Black, Blue and White Band, Black Top.

MALANCHA. Brocklebank. Length, 518 ft.; Gross Tonnage, 9,917; Funnel: Black, Blue and White Band, Black Top.



MACHARDA. Brocklebank. Length, 518 ft.; Gross Tonnage, 9,785; Funnel: Black, Blue and White Band, Black Top.

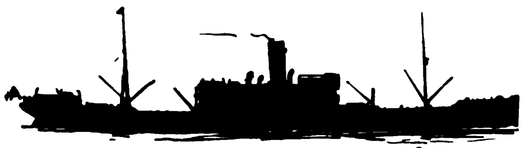
DROTTNINGHOLM. Swedish American Line. Length, 517 ft.; Gross Tonnage, 11,055; Funnel: Yellow, Blue Disc.



M.S. HARRY G. SEIDEL. Baltisch Amer. Petrol. Import. Length, 513 ft. 2 ins.; Gross Tonnage, 11,395.

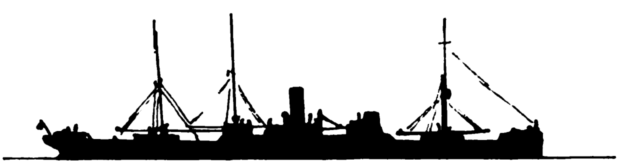
PRESIDENT ROOSEVELT. PRESIDENT HARDING. United States Lines. Length, 516 ft. 5 ins.; Gross Tonnage, 13,869; Funnel: Red, White Band, Blue Top.

KRALJICA MARIJA. **Jugoslavenski Lloyd.** Length, 515 ft. 2 ins.; Gross Tonnage, 10,196.



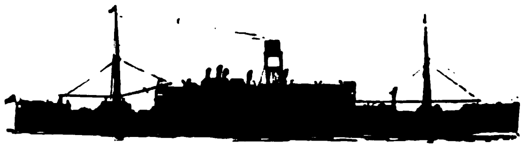
FUSHIMI MARU. SUWA MARU. Nippon Yusen Kaisha. Length, 513 ft. and 516 ft.; Gross Tonnage, 10,936 and 10,672; Funnel: Black.

M.S. HIKAWA MARU. M.S. HIYE MARU. M.S. HEIAN MARU. Nippon Yusen Kaisha. Length, 510 ft. to 512 ft. 6 ins.; Gross Tonnage, 11,622 to 11,616; Funnels: Black.

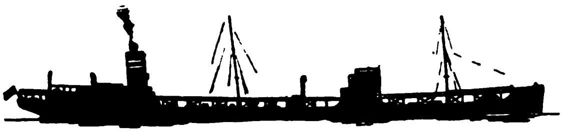


HORORATA. New Zealand Shipping Co. Length, 511 ft. 1 in.; Gross Tonnage, 11,245; Funnel: Buff.

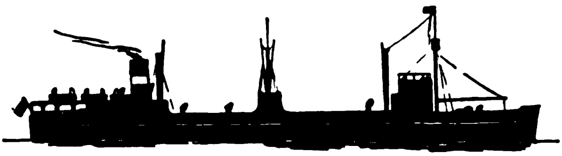
PHILOCTETES. ACHILLES. TYNDAREUS. Blue Funnel Line. Length, 511 ft. 9 ins., 507 ft. 4 ins., and 507 ft.; Gross Tonnage, 11,431 to 11,347; Funnel: Blue, Black Top.



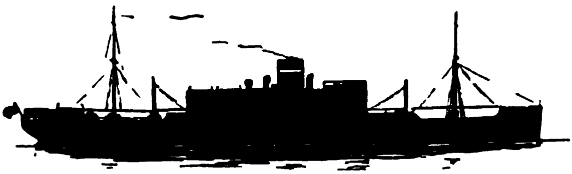
VOLTAIRE. VANDYCK. Lamport and Holt. Length, 510 ft. 6 ins.;
Gross Tonnage, 13,248 and 13,233;
Funnel: Blue, White Band, Black Top.



M.S. VICTOLITE. M.S. VANCOLITE. Imperial Oil Co. Length, 510 ft. 2 ins.;
Gross Tonnage, 11,410 and 11,404;
Funnel: Black, Blue Band between Two White, Black Top.



TAFELBERG. Kerguelen Sealing and Whaling Co. Length, 508 ft. 3 ins.;
Gross Tonnage, 13,640.



M.S. TERUKUNI MARU. M.S. YASUKUNI MARU. Nippon Yusen Kaisha.
Length, 507 ft. and 505 ft.; Gross Tonnage, 11,930;
Funnel: Black, Broad White Band, Two Red on White.

BEAVERFORD. BEAVERHILL. BEAVERBURN. BEAVERBRAE. BEAVERDALE.
Canadian Pacific. Length, 503 ft.; Gross Tonnage, 10,042 to 9,956;
Funnel: Yellow.

PRESIDENT HAYES.	**Dollar Steamship Lines.**	Length,	502 ft.;	Gross	Tonnage,		10,533;
PRESIDENT MONROE.	,,	,,	,,	,,	,,	,,	10,553;
PRESIDENT VANBUREN.	,,	,,	,,	,,	,,	,,	10,533;
PRESIDENT ADAMS.	,,	,,	,,	,,	,,	,,	10,516;
PRESIDENT HARRISON.	,,	,,	,,	,,	,,	,,	10,504;
PRESIDENT POLK.	,,	,,	,,	,,	,,	,,	10,500;
PRESIDENT GARFIELD.	,,	,,	,,	,,	,,	,,	10,495;

Funnel: Black, White $ on Red Band.

PORT MELBOURNE. PORT NAPIER. PORT SYDNEY. Commonwealth and Dominion Line. Length, 501 ft. 3 ins.; Gross Tonnage, 9,152; Funnel: Red, Black Top.

DARRO. DEMERARA. DESEADO. Royal Mail. Length, 500 ft. 7 ins.; Gross Tonnage, 11,493 to 11,475; Funnel: Buff.

THEMISTOCLES. Aberdeen-White Star Line. Length, 500 ft. 6 ins.; Gross Tonnage, 11,231; Funnel: Buff.

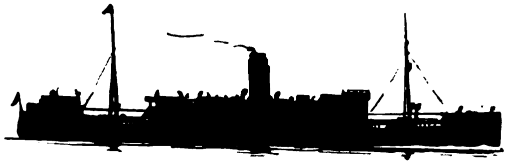
LLANSTEPHAN CASTLE. Union Castle Line. Length, 500 ft. 5 ins.; Gross Tonnage, 11,299; Funnel: Red, Black Top.

TAMAROA. MATAROA. Shaw, Savill and Albion. Length, 500 ft. 4 ins.; Gross Tonnage, 12,354 and 12,333; Funnel: Buff, Black Top.

FORDSDALE. Aberdeen Commonwealth Line. Length, 500 ft.; Gross Tonnage, 9,947; Funnel: Yellow.

GLENIFFER. **Glen Line.** Length, 500 ft.; Gross Tonnage, 9,429; Funnel: Red, Black Top.

CARNARVONSHIRE. **Royal Mail.** Length, 500 ft. 8 ins.; Gross Tonnage, 9,406; Funnel: Buff.

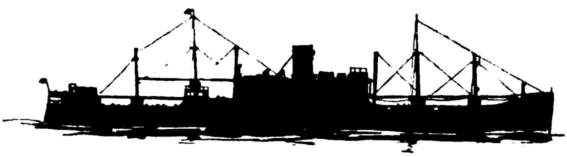


CRISTOBAL COLON. HABANA. **Compañia Trasatlantica.** Length, 499 ft. 4 ins. and 480 ft.; Gross Tonnage, 10,833 and 10,551; Funnel: Black.

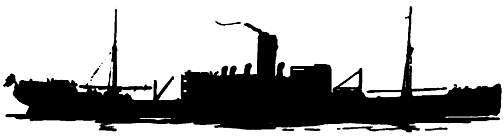
MAGDAPUR. MANIPUR. **Brocklebank Line.** Length, 499 ft. 6 ins.; Gross Tonnage, 9,237; Funnel: Black, Blue and White Band, Black Top.

SIERRA NEVADA. **Hamburg-South Amerika.** Length, 499 ft. 5 ins.; Gross Tonnage, 13,589; Funnel: White, Red Top.

SARPEDON. HECTOR. ANTENOR. **Blue Funnel Line.** Length, 499 ft., 498 ft. 8 ins., 497 ft. 7 ins.; Gross Tonnage, 11,321 to 11,174; Funnel: Blue, Black Top.



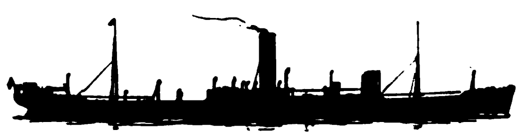
EASTERN PRINCE. WESTERN PRINCE. NORTHERN PRINCE. SOUTHERN PRINCE. **Prince Line.** Length, 496 ft. 2 ins.; Gross Tonnage, 10,926 to 10,917; Funnel: Black, Two Red Bands, Feathers on side.



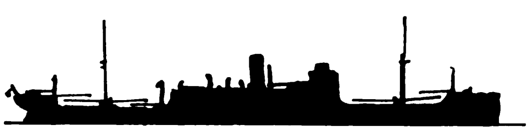
HARUNA MARU. HAKONE MARU. HAKOZAKI MARU. HAKUSAN MARU.
Nippon Yusen Kaisha. Length, 495 ft.; Gross Tonnage, 10,421 to 10,380;
Funnel: Black.

M.S. CARIBIA. M.S. CORDILLERA. Hamburg-Amerika. Length, 494 ft.;
Gross Tonnage, 12,049;
Funnel: Yellow, with Black, White and Red Bands at Top.

AENEAS. ASCANIUS. ANCHISES. Blue Funnel Line. Length, 493 ft.;
Gross Tonnage, 10,058 to 10,000;
Funnel: Blue, Black Top.



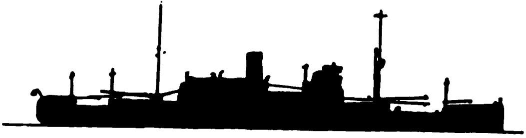
DIOMED. CALCHAS. PERSEUS. MENELAUS. Blue Funnel Line.
Length, 491 ft., 490 ft. 8 ins., 490 ft. 5 ins. and 495 ft. 5 ins.;
Gross Tonnage, 10,374 to 10,283;
Funnel: Blue, Black Top.



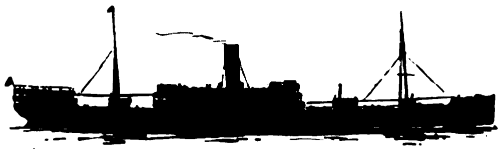
M.S. DELFTDIJK. M.S. DAMSTERDIJK. Holland-Amerika. Length, 490 ft. 9 ins.;
Gross Tonnage, 10,220 and 10,155;
Funnel: Buff, White Band between Two Green.

M.S. POELAU BRAS. POELAU LAUT. POELAU ROEBIAH. POELAU TELLO.
Stoomvaart Maatschappij Nederland. Length, 490 ft.; Gross Tonnage, 9,250;
Funnel; Buff, Black Top.

CITY OF EXETER. **Ellerman City Line.** Length, 486 ft. 7 ins.; Gross Tonnage, 9,447; Funnel: Buff, White Band, Black Top.



SULTAN STAR. **M.S. TUSCAN STAR.** **Blue Star Line.** Length, 486 ft. 1 in. and 471 ft.; Gross Tonnage, 12,306 and 11,449; Funnel: Red, Black Top and White Band on Black, Blue Star on White Disc.



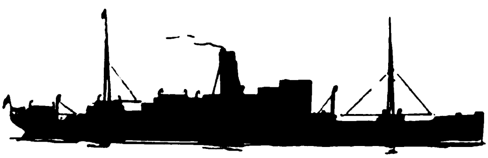
REMUERA. **New Zealand Shipping Co.** Length, 485 ft.; Gross Tonnage, 11,383; Funnel: Yellow.

M.S. GLENGARRY. **M.S. GLENBEG.** **M.S. GLENAPP.** **M.S. GLENOGLE.** **Glen Line.** Length, 485 ft.; Gross Tonnage, 9,450 to 9,513; Funnel: Red, Black Top.

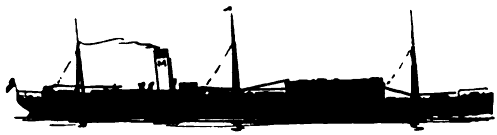
M.S. DINTELDIJK. **M.S. DRECHTDIJK.** **Holland-Amerika.** Length, 485 ft.; Gross Tonnage, 9,399 and 9,338; Funnel: Buff, Two Green Bands, White between Buff Top.

M.S. LOCHKATRINE. **M.S. LOCHGOIL.** **M.S. LOCHMONAR.** **Royal Mail.** Length, 485 ft.; Gross Tonnage, 9,409; Funnel: Buff.

CITY OF PARIS. **Ellerman City Line.** Length 484 ft. 7 ins.; Gross Tonnage, 10,902; Funnel: Buff, White Band, Black Top.

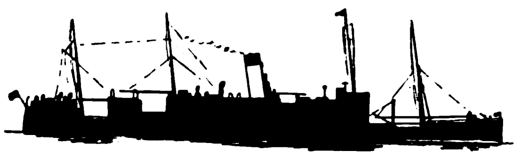


KERGUELEN. **Chargeurs Réunis.** Length, 484 ft. 2 ins.; Gross Tonnage, 10,123; Funnel: Yellow, Red Stars on White Band.



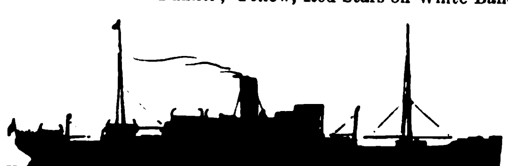
MAUI. **Matson Navigation Co.** Length 484 ft.; Gross Tonnage, 9,801;
Funnel: Yellow, Black Top, with "M."

M.S. STAFFORDSHIRE. SHROPSHIRE. CHESHIRE. Bibby Line.
Length, 483 ft. 6 ins.; Gross Tonnage, 10,654 to 10,560;
Funnel: Salmon Pink, Black Top.



M.S. WORCESTERSHIRE. Bibby Line. Length, 483 ft.; Gross Tonnage, 11,453;
Funnel: Salmon Pink, Black Top.

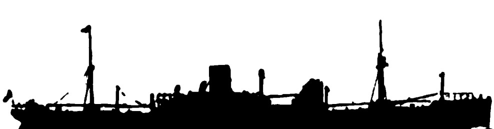
CEYLAN. **Chargeurs Réunis.** Length, 482 ft. 3 ins.; Gross Tonnage, 8,430;
Funnel; Yellow, Red Stars on White Band.



FORMOSE / **GROIX.**	**Chargeurs Réunis.**	Length, 483 ft. 4 ins.;	Gross Tonnage, 9,975;
BELLE ISLE.	.. .. ,,	479 ft.;	,, ,, 9,591;
AURIGNY.	.. .. .,	481 ft. 6 ins.:	., ,, 9,589;
DESIRADE / **EUBEE.**	" " ,,	483 ft. 4 ins.;	,, ,, 9,645;

Funnel: Yellow, Red Stars on White Band.

COMPIÈGNE. CHANTILLY. Messageries Maritimes. Length 478 ft. 5 ins.;
Gross Tonnage 9,986;
Funnel: Black.



M.S. ZEALANDIC. M.S. COPTIC. Shaw, Savill and Albion. Length, 482 ft. 6 ins.;
Gross Tonnage, 8,281;
Funnel: Buff, Black Top.

M.S. CABO SAN ANTONIO. M.S. SANTO THOME. Ybarra & Co.
Length, 482 ft. 5 ins.; Gross Tonnage, 12,275 and 11,868;
Funnel: Black.

YORKSHIRE. LANCASHIRE. Bibby Line. Length, 482 ft. 4 ins.; Gross Tonnage, 10.184 and 9,445;
Funnel: Salmon Pink, Black Top.

DIPLOMAT. Harrison Line. Length, 482 ft.; Gross Tonnage, 8,218;
Funnel: Black, Red Band between Two White.

URUGUAY. Compañia Trasatlantica. Length, 481 ft. 9 ins.; Gross Tonnage, 10,348;
Funnel: Black.

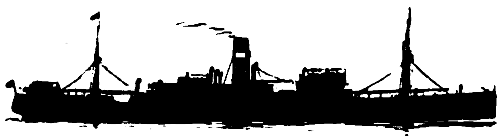
PORT ADELAIDE. PORT AUCKLAND. PORT BOWEN. PORT BRISBANE. PORT CAMPBELL. PORT CAROLINE. PORT HARDY. PORT HUNTER. PORT NICHOLSON. Commonwealth and Dominion Line. Length, 481 ft. 2 ins.;
Gross Tonnage, 8,267 to 8,653;
Funnel: Red, Black Top.

ARGENTINA. Compania Trasatlantica. Length, 480 ft.; Gross Tonnage, 10,137;
Funnel: Black.

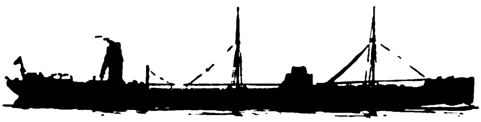
RUAHINE. **New Zealand Shipping Co.** Length, 480 ft. 6 ins.; Gross Tonnage, 10,870; Funnel: Yellow.

NEURALIA. NEVASA. **British India S.N. Co.** Length, 480 ft. 5 ins.; Gross Tonnage, 9,182; Funnel: Black, Two White Bands.

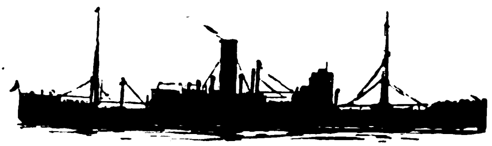
M.S. INDRAPOERA. **Rotterdam Lloyd.** Length, 479 ft. 5 ins.; Gross Tonnage, 10,746; Funnel: Black.



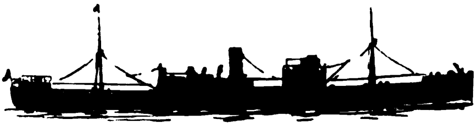
CITY OF SIMLA. **Ellerman City Line.** Length, 476 ft. 7 ins.; Gross Tonnage, 9,468; Funnel: Buff, White Band, Black Top.



IROQUOIS. **Anglo-American Oil Co.** Length, 476 ft. 3 ins.; Gross Tonnage, 9,202; Funnel; Red, Black Top.

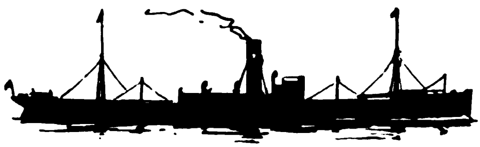


STUART STAR. AFRIC STAR. NAPIER STAR. RODNEY STAR. Blue Star Line.
Length, 475 ft. 8 ins. to 476 ft. 9 ins.; Gross Tonnage, 11,884 to 10,583;
Funnel: Red, Black Top and White Band, Blue Star on White Disc.



M.S. PORT ALMA. M.S. PORT FAIRY. M.S. PORT HUON. M.S. PORT FREMANTLE. M.S. PORT GISBORNE. Commonwealth and Dominion. Length, 477 ft. 3 ins.; Gross Tonnage, about 8,000; Funnel: Red, Black Top.

DUNLUCE CASTLE. DURHAM CASTLE. Union Castle. Length, 475 ft. 5 ins.; Gross Tonnage, 8,130; Funnel: Red, Black Top.

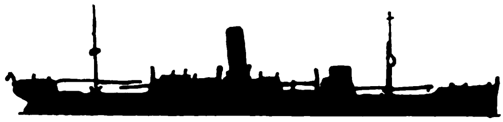


ARIZONA MARU. HAWAII MARU. MANILA MARU. AFRICA MARU. Osaka Shosen Kaisha. Length, 475 ft.; Gross Tonnage, 9,618 to 9,414; Funnel: Black, Two White Bands, joined at Side.

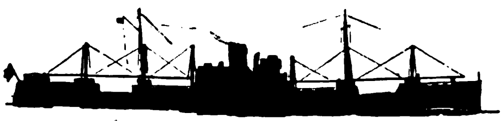
DOMINIA. Telegraph Construction and Maintenance Co. Length, 475 ft.; Gross Tonnage, 9,250; Funnel: Yellow.

OXFORDSHIRE. Bibby Line. Length, 474 ft. 7 ins.; Gross Tonnage, 8,624; Funnel: Salmon Pink, Black Top.

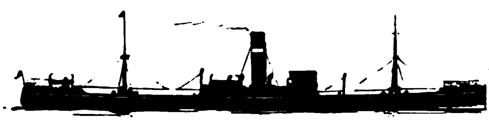
LLANDAFF CASTLE. LLANDOVERY CASTLE. Union Castle Line. Length, 471 ft. 1 in.; Gross Tonnage, 10,786, and 10,609; Funnel: Red Black Top.



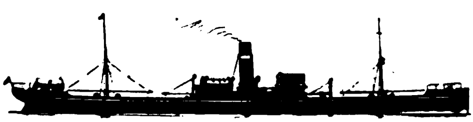
HERMINIUS. **Shaw, Savill, and Albion.** Length, 477 ft.; Gross Tonnage, 8,000; Funnel: Buff, Black Top.



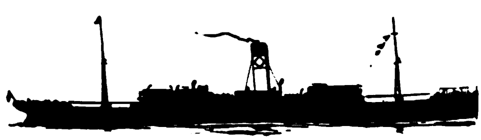
M.S. OPAWA. **M.S. ORARI.** **M.S. OTAIO.** **New Zealand Shipping Co.** Length, 471 ft., 471 ft. and 472 ft. 2 ins.; Gross Tonnage, 10,107, 10,107 and 10,048; Funnel: Yellow.



MAIDAN. **MAHOUT.** **MAHSEER.** **MAHRONDA.** **MAIHAR.** **MALAKAND.** **MATHERAN.** **MANAAR.** **Brocklebank.** Length, 470 ft. 4 ins.; Gross Tonnage, 8,077; Funnel: Black, Blue and White Band, Black Top.



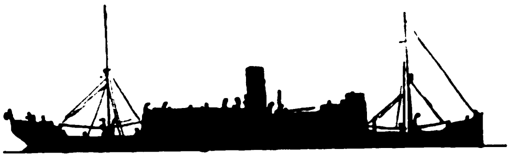
MALAKUTA. **MAHANADA.** **Brocklebank.** Length, 470 ft. 2 ins.; Gross Tonnage, 7,205; Funnel: Black, Blue and White Band, Black Top.



CALAMARES. **PASTORES.** **United Fruit Co.** Length, 470 ft. 4 ins.; Gross Tonnage, 7,233 and 7,242; Funnel: Buff, White Diamond on Red Band, Black Top.

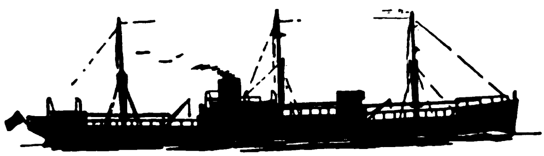
CITY OF NAGPUR. **Ellerman City Line.** Length, 469 ft. 9 ins.; Gross Tonnage, 10,138; Funnel: Buff, White Band, Black Top.

GLOUCESTERSHIRE. **Bibby Line.** Length, 467 ft. 2 ins.; Gross Tonnage, 8,124; Funnel: Salmon Pink, Black Top.



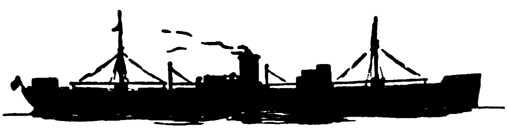
AMARAPOORA. **Henderson Line.** Length, 465 ft. 8 ins.; Gross Tonnage, 8,012; Funnel: Black.

MADURA. MALDA. MANTOLA. MATIANA. MODASA. **British India S.N. Co.** Length, 465 ft. 2 ins.; Gross Tonnage, about 9,000; Funnels: Black, Two White Bands.

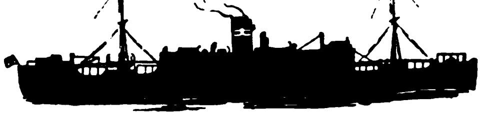


TAJANDOEN. **Stoomvaart Maatschappij Nederland.** Length, 465 ft.; Gross Tonnage, 8,800; Funnel: Buff. Black Top.

M.S. PORT DUNEDIN. M.S. PORT HOBART. **Commonwealth and Dominion Line.** Length, 465 ft.; Gross Tonnage, 7,500; Funnel: Red, Black Top.



M.S. THURLAND CASTLE. M.S. PENRITH CASTLE. **Lancashire Shipping Co.** Length, 464 ft. 6 ins.; Gross Tonnage, 6,372 and 6,369; Funnel: Red, Black Top.



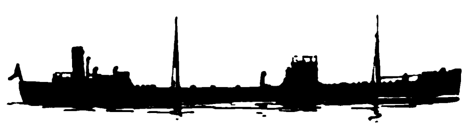
M.S. BUENOS AIRES MARU. M.S. RIO DE JANEIRO MARU. **Osaka Shoden Kaisha.** Length, 461 ft. 3 ins.; Gross Tonnage, 9,626; Funnel: Black, Two White Bands joined at Side.

TEKOA. TONGARIRO. TURAKINA. New Zealand Shipping Co. Length, 460 ft. 5 ins.;
Gross Tonnage, 8,565 to 8,531;
Funnel: Yellow.

KENT. MIDDLESEX. SURREY. Federal Steam Nav. Co.
Funnel: Red, Black Top. St. George's Flag with Blue Square in centre, on Red.

M.S. HEIYO MARU. Nippon Yusen Kaisha. Length, 460 ft.;
Gross Tonnage, 9,816;
Funnel: Black, Broad White Band, Two Red on White.

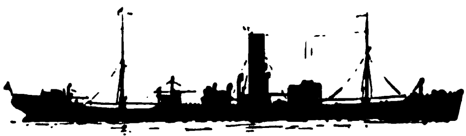
TAINUI. Shaw, Savill, and Albion. Length, 477 ft. 8 ins.; Gross Tonnage, 9,965;
Funnel: Buff, Black Top.



M.S. GULFCREST. Gulf Refining Co. of New York. Length, 460 ft.;
Gross Tonnage, 8,952.

RAJULA. ROHNA. British India S.N. Co. Length, 460 ft.;
Gross Tonnage, 8,478 and 8,602;
Funnel: Black, Two White Bands.

CITY OF LYONS. Ellerman Line. Length, 455 ft.; Gross Tonnage, 7,063;
Funnel: Buff, White Band, Black Top.



AGAPENOR. AUTOLYCUS. AUTOMEDON. DARDANUS. ELPENOR. EUMAEUS. GLAUCUS. HELENUS. LYCAON. MACHAON. MENTOR. MERIONES. PHEMIUS. PYRRHUS. RHEXENOR. TEIRESIAS. TROILUS. Blue Funnel Line.
Length, 455 ft. 2 ins.; Gross Tonnage, 7,552 to 7,957;
Funnel: Blue, Black Top.

COSTA RICA. Nederland Stoomvaart Maatschappij.
Length, 455 ft.; Gross Tonnage, 8,300;
Funnel; Buff, Black Top.

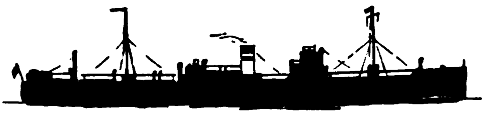
COLLEGIAN. Harrison Line. Length, 455 ft.; Gross Tonnage, 5,850;
Funnel: Black, Red Band between Two White.

CLAN MACTAGGART. CLAN MACTAVISH. Clan Line. Length, 452 ft. 7 ins., and 469 ft.; Gross Tonnage, 7,602 and 7,619;
Funnel: Black, Two Red Bands.

GARTH CASTLE. GRANTULLY CASTLE. GLOUCESTER CASTLE. GUILDFORD CASTLE. Union Castle. Length, 452 ft. 6 ins.; Gross Tonnage, 7,715;
Funnel: Red, Black Top.

HEREFORDSHIRE. Bibby Line. Length, 452 ft. 3 ins.; Gross Tonnage, 7,126;
Funnel: Salmon Pink, Black Top.

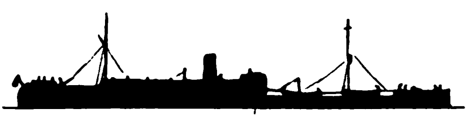
MANUEL ARNUS. Compañia Trasatlantica. Length, 435 ft.; Gross Tonnage, 7,578;
Funnel: Black.



M.S. SILVERPALM. M.S. SILVERWILLOW. M.S. SILVERYEW. Silver Line,
Length, 450 ft. 9 ins.; Gross Tonnage, 6,373.

M.S. ACCRA. M.S. APAPA. Elder Dempster. Length, 450 ft. 7 ins.;
Gross Tonnage, 9,337 and 9,333;
Funnel: Buff.

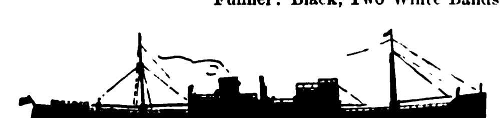
M.S. ABA. M.S. ADDA. Elder Dempster. Length, 450 ft. 5 ins. and 435 ft. 3 ins.;
Gross Tonnage, 7,937 and 7,816;
Funnel: Buff.



M.S. SOMERSETSHIRE. M.S. DORSETSHIRE. Bibby Line. Length, 450 ft. 3 ins.;
Gross Tonnage, 9,648 and 9,645;
Funnel: Pink, Black Top.

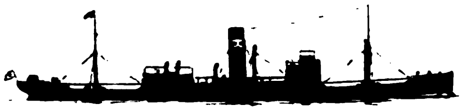
EXCALIBUR. EXETER. EXCAMBION. EXOCHORDA. American Export Lines.
Length, 450 ft.; Gross Tonnage, 9,360.

M.S. DOMALA. British India S.N. Co. Length, 450 ft.; Gross Tonnage, 8,441;
Funnel: Black, Two White Bands.



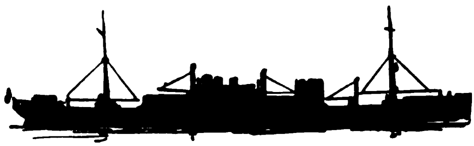
CITY OF NEW YORK. American-South African Line.
Length, 450 ft.; Gross Tonnage, 8,272.

BRITANNIA. Anchor. Length, 450 ft.; Gross Tonnage, 8,464; Funnel: Black.



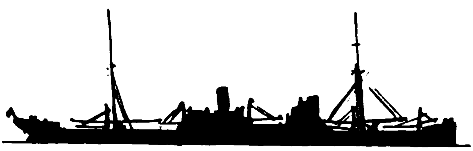
LONDON MARU. PARIS MARU. Osaka Shosen Kaisha. Length 450 ft. 1 in.; Gross Tonnage, 7,191; Funnel: Black, Two White Bands joined at Sides.

MAKURA. Union Steam Ship Co. of N.Z. Length, 450 ft.; Gross Tonnage, 8,075; Funnel: Red, Black Top.

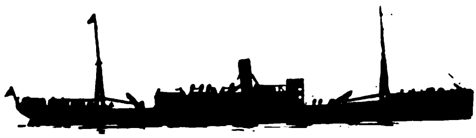


M.S. ESQUILINO. M.S. VIMINALE. Lloyd Triestino. Length, 450 ft. and 467 ft. 5 ins.; Gross Tonnage, 8,657.

MANCHESTER REGIMENT. LONDON IMPORTER. LONDON MERCHANT. Furness Lines. Length, 450 ft.; Gross Tonnage, 7,930; Funnel: Red, Black Top, Black Base and Black Band.



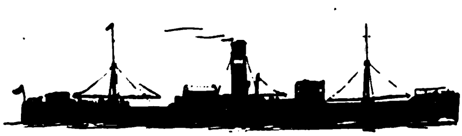
M.S. DURENDA. British India S.N. Co. Length, 450 ft.; Gross Tonnage, 7,241; Funnel: Black, Two Narrow White Bands.



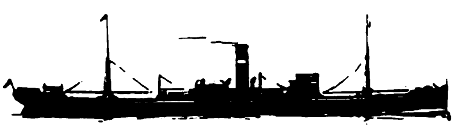
NOVARA. **Peninsular and Oriental.** Length, 449 ft. 7 ins.; Gross Tonnage, 6,875;
Funnel: Black.

NELLORE. **NANKIN.** **Eastern and Australian Line.** Length, 450 ft.;
Gross Tonnage, about 7,000;
Funnel: Black.

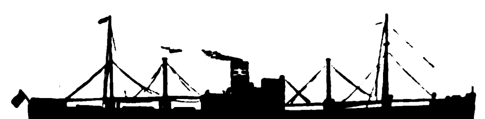
M.S. KOTA PINANG. **M.S. KOTA TJANDI.** **M.S. KOTA NOPAN.** **M.S. KOTA AGOENG.**
Rotterdam Lloyd. Length, 449 ft.; Gross Tonnage, 7,275 to 7,331;
Funnel: Black.



MASIRAH. **Anchor-Brocklebank Line.** Length, 448 ft.; Gross Tonnage, 6,836;
Funnel: Black, Blue and White Band, Black Top.

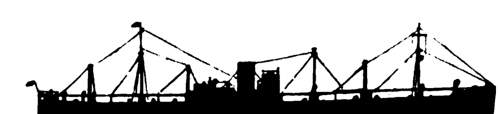


ANCHORIA. **Anchor-Brocklebank Line.** Length, 446 ft. 4 ins.; Gross Tonnage, 6,112;
Funnel: Black, Blue and White Band, Black Top.



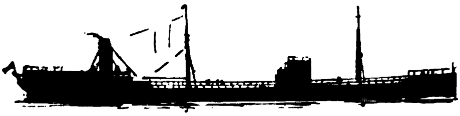
M.S. KINAI MARU. **M.S. TOKAI MARU.** **M.S. SANYO MARU.** **M.S. HOKUROKU MARU.**
Osaka Shosen Kaisha. Length, 446 ft.; Gross Tonnage, 8,365;
Funnel: Black, Two White Bands joined at Side.

MAHRATTA. **MAKALLA.** **Anchor-Brocklebank Line.** Length, 445 ft.; Gross Tonnage, 6,690;
Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

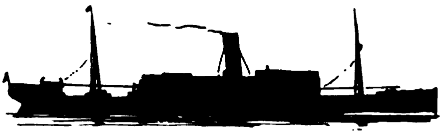


CINGALESE PRINCE. **Rio Cape Line.** Length, 441 ft. 8 ins.; Gross Tonnage, 6,750;
Funnel: Black, Two Red Bands, Feathers on Side.

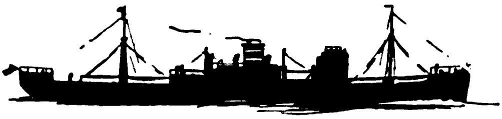
M.S. CHINESE PRINCE. M.S. JAPANESE PRINCE. M.S. JAVANESE PRINCE. M.S. MALAYAN PRINCE. **Rio Cape Line.** Length, 441 ft.; Gross Tonnage, 6,734; Funnel: Black, Two Red Bands, Feathers on Side.



BRITISH MERCHANT. **British Tanker Co.** Length, 440 ft. 7 ins.; Gross Tonnage, 6,994; Funnel: Red, White Band, Black Top; Green Band on White.



ZEELANDIA. **Holland Lloyd.** Length, 440 ft. 7 ins.; Gross Tonnage, 7,995; Funnel: Yellow, Black Band.



M.S. BARBARIGO. **Società Veneziana.** Length, 440 ft. 7 ins.; Gross Tonnage, 5,293; Funnel: Black, Red Band between Two White.

M.S. TJINEGARA. M.S. TJISADANE. **Java-China-Japan Line.** Length, 440 ft. 6 ins.; Gross Tonnage, 9,227; Funnel: Black.

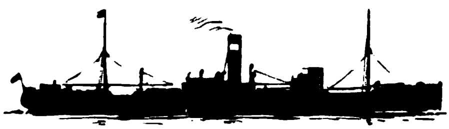
HILDEBRAND. **Booth Line.** Length, 440 ft. 3 ins.; Gross Tonnage, 6,995; Funnel: Black.

ELYSIA. **Anchor.** Length, 440 ft.; Gross Tonnage, 6,368; Funnel: Black.

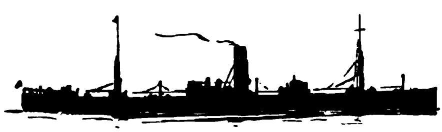
M.S. ERRIA. **East Asiatic Co.** Length, 440 ft. 3 ins.; Gross Tonnage, 8,636.

M.S. PACIFIC RELIANCE. M.S. PACIFIC ENTERPRISE. M.S. PACIFIC RANGER.
Furness Withy. Length, 435 ft.; Gross Tonnage, 6,570;
Funnel: Black, Red, Thin Black and Red Band, Black Top.

M.S. GLENAMOY. **Glen Line.** Length, 435 ft.; Gross Tonnage, 7,269;
Funnel: Red, Black Top.

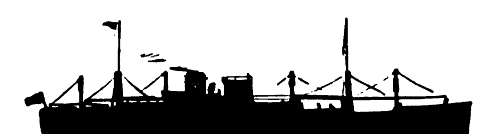


CITY OF NORWICH. **Ellerman (Hall Line).** Length, 434 ft. 3 ins.; Gross Tonnage, 6,726;
Funnel: Buff, White Band, Black Top.



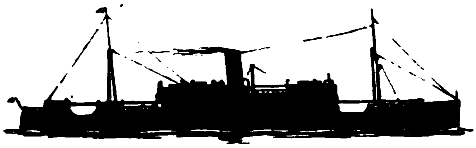
NAGINA. **British India S.N. Co.** Length, 433 ft.; Gross Tonnage, 6,651;
Funnel: Black, Two White Bands.

TJIBADAK. **Java-China-Japan Line.** Length, 433 ft.; Gross Tonnage, 7,803;
Funnel: Black.



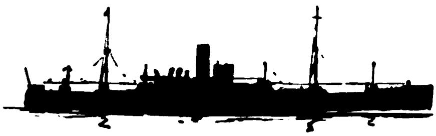
M.S. DUNSTER GRANGE. **Furness-Houlder.** Length, 431 ft. 3 ins.;
Gross Tonnage, 9,494;
Funnel: Black, Red Band with White Maltese Cross, Black Top.

TAKADA. **British India S.N. Co.** Length, 430 ft. 1 in.; Gross Tonnage, 6,949; Funnel: Black, Two White Bands, Black Top.



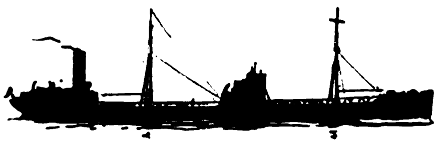
M.S. WESTRALIA. **Huddart Parker.** Length, 431 ft. 1 in.; Gross Tonnage, 8,108; Funnel: Yellow.

M.S. LEIGHTON. M.S. LINNELL. **Lamport and Holt.** Length, 430 ft.; Gross Tonnage, 7,412; Funnel: Light Blue, White Band, Black Top.



M.S. UPWEY GRANGE. M.S. EL ARGENTINO. **Furness-Houlder.** Length, 430 ft.; Gross Tonnage, 9,130 and 9,501; Funnel: Black, Red Band with White Maltese Cross, Black Top.

HARDWICKE GRANGE. **Furness-Houlder.** Length, 430 ft.; Gross Tonnage, 9,005; Funnel: Black, Red Band with White Maltese Cross, Black Top.

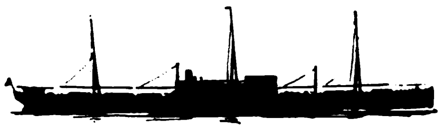


BRITISH INVENTOR. **British Tanker Co.** Length, 430 ft.; Gross Tonnage, 7,101; Funnel: Red, White Band, Black Top, Green Band on White.

ANTONIO LOPEZ. **Compañia Trasatlantica.** Length, 430 ft.; Gross Tonnage, 5,975; Funnel: Black.

MARQUESA. BARONESA. DUQUESA. PRINCESA. CANONESA. Furness-Houlder. Length, 430 ft.; Gross Tonnage, 8,972 to 8,286; Funnel: Black, Red Band with White Maltese Cross, Black Top.

M.S. COLOMBIA. Royal Nederlands Line. Length, 429 ft. 5 ins.; Gross Tonnage, 10,782; Funnel: Black, Two White Bands.



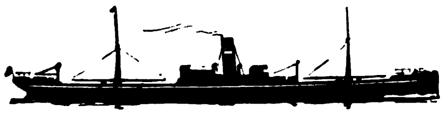
M.S. BUENOS AIRES. M.S. CANADA. M.S. BALBOA. Axel Axelson Johnson. Length, 426 ft. 9 ins.; Gross Tonnage, 5,614 to 5,524.

M.S. IRISBANK. Bank Line. Length, 426 ft. 7 ins.; Gross Tonnage, 5,626; Funnel: Yellow, Black Top.

BAYANO. CAMITO. CORONADO. ARIGUANI. CARARE. CAVINA. Elders and Fyffes. Length, 425 ft. 5 ins.; Gross Tonnage, 6,611 to 6,907; Funnel: Buff, Black Top.

M.S. ALSIA. East Asiatic Co. Length, 425 ft. 2 ins.; Gross Tonnage, 5,812.

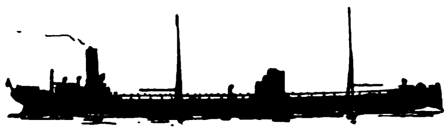
M.S. EURYBATES. Blue Funnel Line. Length, 431 ft. 9 ins.; Gross Tonnage, 6,445; Funnel: Blue, Black Top.



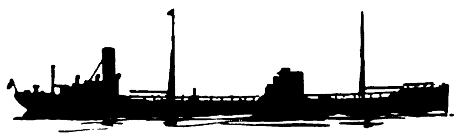
STOCKWELL. **Anchor-Brocklebank Line.** Length, 425 ft.; Gross Tonnage, 5,643: Funnel: Black, Blue and White Band, Black Top.

CAIRNROSS. **Cairn Line.** Length, 425 ft.; Gross Tonnage, 5,494; Funnel: Black, White Triangle on Red Band.

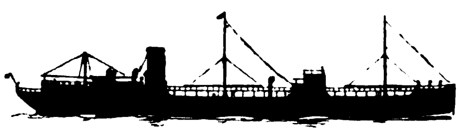
KARAGOLA. KHANDALLA. **British India S.N. Co.** Length, 425 ft.; Gross Tonnage, 7,053; Funnel: Black, Two White Bands, Black Top.



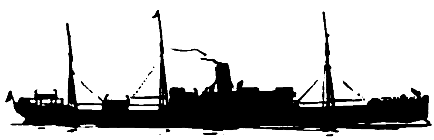
TUSCARORA. **Anglo American Oil Co.** Length, 425 ft.; Gross Tonnage, 7,106; Funnel: Red, Black Top.



M.S. NARRAGANSETT. **Anglo American Oil Co.** Length, 425 ft.; Gross Tonnage, 6.874; Funnel; Red, Black Top.



M.S. MEGARA. **M.S. MIRZA.** **Anglo-Saxon Petroleum Co.** Length, 423 ft.; Gross Tonnage, 7,992 and 8,004, Funnel: Buff, Black Top.



MANUEL CALVO. **Compañia Trasatlantica.** Length, 421 ft.; Gross Tonnage, 5,617; Funnel: Black.

KAROOLA. **McIlwraith, McEacharn.** Length, 420 ft. 5 ins.;
Gross Tonnage, 7,391;
Funnel: Red, Black Top.

MARAMA. **Union Steamship Co. of N.Z.** Length, 420 ft. 3 ins.; Gross Tonnage, 6,497;
Funnel: Red, Black Top.

SAN EDUARDO. SAN SILVESTRE. SAN TIRSO. SAN VALERIO. SAN ZEFERINO.
Eagle Oil Transport Co.
Length, 420 ft. 2 ins.; Gross Tonnage, 6,220;
Funnel: Black, Yellow Band, Black Eagle, Black O on White Band, Yellow Band.
SAN RICARDO. **Cia. Navigazione San Ricardo.**

ALNMOOR. BLYTHMOOR. CASTLEMOOR. **Runciman.** Length, 420 ft.;
Gross Tonnage, 6,573;
Funnel: Black, White Band, Blue R.

PATUCA. **Elders and Fyffes.** Length, 417 ft. 2 ins.; Gross Tonnage, 6,103;
Funnel: Buff, Black Top.

D'ENTRECASTEAUX. FORBIN.	**Chargeurs Réunis.**	Length,	417 ft.;	Gross Tonnage,	7,291;
DUPLEIX.	,,	,,	,, ,,	,,	7,135;
ANGO.	,,	,,	416 ft.;	,,	7,110;
BOUGAINVILLE.	,,	,,	,, ,,	,,	7,110;

Funnel: Yellow, Red Stars on White Band.

LADY DRAKE. LADY HAWKINS. LADY NELSON. **Canadian National (West Indies) Steamships.** Length, 415 ft.; Gross Tonnage, 7,650;
Funnel: Red, White Band, Blue Top.

LADY RODNEY. LADY SOMERS. **Canadian National Steamships.** Length, 415 ft.;
Gross Tonnage, 7,650;
Funnel: Red, White Band, Blue Top.

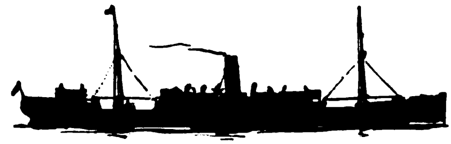
MUNARGO. **Munson Steamship Co.** Length, 415 ft.; Gross Tonnage, 6484;
Funnel: Blue, White Band, Black Top.

BELVEDERE. **Cosulich Line.** Length, 412 ft.; Gross Tonnage, 7,420;
Funnel: Red, White Band, Black Top.

FORT ST. GEORGE. **Furness Withy.** Length, 411 ft. 3 ins.; Gross Tonnage, 7,785;
Funnel: Black, Red, Thin Black and Red Bands, Black Top.

ERINPURA. **British India S.N. Co.** Length, 411 ft.; Gross Tonnage, 5,128;
Funnel: Black, Two White Bands, Black Top.

CLAN MACNAB. CLAN MACNAIR. CLAN MACNAUGHTON. CLAN MACNEIL. CLAN MONROE. CLAN MORRISON. CLAN MURDOCH. CLAN MURRAY. **Clan Line.**
Length, 410 ft. 6 ins.; Gross Tonnage, 6,114;
Funnel: Black, Two Red Bands.

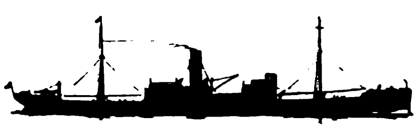


BUENOS AIRES. **Compañia Trasatlantica.** Length, 410 ft. 6 ins.; Gross Tonnage, 5,311; Funnel: Black.

MONTEVIDEO. **Compañia Trasatlantica.** Length, 410 ft. 5 ins.; Gross Tonnage, 5,205; Funnel: Black.

ZEALANDIA. **Huddart, Parker.** Length, 410 ft.; Gross Tonnage, 7,000; Funnel: Yellow.

MEDIA. **Anchor-Brocklebank.** Length, 410 ft.; Gross Tonnage, 5,437; Funnel: Black, Blue and White Band, Black Top.

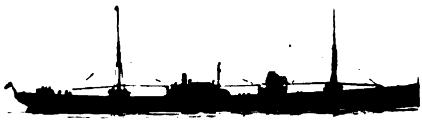


OCEAN PRINCE. **Furness Withy.** Length, 410 ft.; Gross Tonnage, 5,212; Funnel: Black, Red, Thin Black and Red Bands, Black Top.

ELLENGA. **British India S.N. Co.** Length, 410 ft.; Gross Tonnage, 5,196; Funnel: Black, Two White Bands, Black Top.

DRAMATIST. **Harrison Line.** Length, 410 ft.; Gross Tonnage, 5,443; Funnel: Black, Red Band between Two White.

JAMAICA MERCHANT. **Jamaica Direct Fruit Line.** Length 413 ft.; Gross Tonnage, 7,459;
JAMAICA PLANTER. ,, ,, ,, ,, 413 ft.; ,, 7,482;
JAMAICA PRODUCER. ,, ,, ,, ,, 414 ft.; ,, 7,472;
JAMAICA SETTLER. ,, ,, ,, ,, 405 ft.; ,, 7,256;
Funnel: Blue, Two White Bands, Black Top.



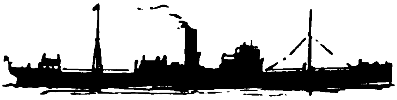
M.S. LOUISIANA. **Det Forenede Dampskibs Selskab.** Length, 407 ft. 8 ins.;
Gross Tonnage, 6,518;
Funnel: Flamingo, Red, Black Top.

NEWFOUNDLAND. NOVA SCOTIA. **Warren Line (Furness Withy).** Length, 405 ft.;
Gross Tonnage, 6,820;
Funnel; Black, Red, Thin Red and Black Bands.

M.S. GLENLUCE. **Glen Line.** Length, 405 ft.; Gross Tonnage, 6,754;
Funnel: Red, Black Top.

BREDA. **Koninklijke Nederlandsche Stoomboot Mij.** Length, 402 ft. 6 ins.;
Gross Tonnage, 6,906;
Funnel: Black, Two White Bands.

CAIRNESK. CAIRNGLEN. **Cairn Line.** Length, 401 ft. 9 ins.;
Gross Tonnage, 5,007 and 5,019;
Funnel: Black, White Triangle on Red Band.



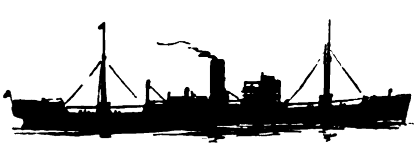
HALIZONES. **Houston Line.** Length, 400 ft. 8 ins.; Gross Tonnage, 5,273;
Funnel: Red, Two Black Bands, Black Top.

ABINSI. Elder Dempster. Length, 400 ft. 5 ins.; Gross Tonnage, 6,365;
Funnel: Buff.

MANISTEE. PATIA. ZENT. Elders and Fyffes. Length, 400 ft. 2 ins.; Gross Tonnage, 5,360;
Funnel: Buff, Black Top.

EDAVANA. British India S.N. Co. Length, 400 ft.; Gross Tonnage, 5,284;
Funnel: Black, Two White Bands, Black Top.

BADAGRY. BARRACOO. BASSA. BATA. BATHURST. BEREBY. BIAFRA. BODNANT. BOUTRY. BOMA. BURUTU. Elder Dempster.
Length, 400 ft.; Gross Tonnage, 5,300;
Funnel: Buff.

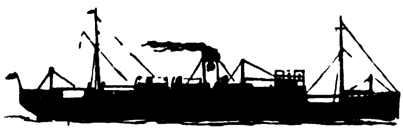


M.S. DOLIUS. M.S. MEDON. Blue Funnel Line. Length, 407 ft.;
Gross Tonnage, 5,904 and 5,915;
Funnel: Blue, Black Top.

ORANGEMOOR. FERNMOOR. Runciman. Length, 399 ft. 6 ins.; Gross Tonnage, 6,573;
Funnel: Black, White Band, Blue R.

CAIRNDHU. CAIRNGOWAN. Cairn Line. Length, 399 ft. 8 ins., and 400 ft.; Gross Tonnage, 5,250 and 5,295; Funnel: Black, White Triangle on Red Band.

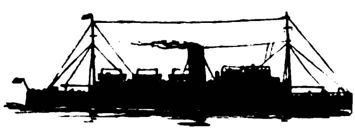
M.S. OLJAREN. Transatlantic S.S. Co. Length, 389 ft.; Gross Tonnage, 5,482; Funnel: Yellow, Black Top.



BRITANNIA. SUECIA. Swedish Lloyd. Length, 375 ft.; Gross Tonnage, 4,500; Funnel: White; Yellow Star on Blue Disc, Black Top.

M.S. STELLA POLARIS. Bergen Steamship Co. Length, 360 ft.; Gross Tonnage, 5,020; Funnel: Yellow

BEN MY CHREE. Isle of Man Steam Packet Co. Length, 355 ft.; Gross Tonnage, 2,586; Funnel: Red, Black Top.



CANTERBURY. Southern Railway. Length, 329 ft.; Gross Tonnage, 2,912; Funnel: Buff, Black Top.

M.S. MALAITA. Burns, Philp and Co. Length, 335 ft.; Gross Tonnage, 3,300.

INDEX.

INDEX TO PROFILES OF WARSHIPS.

(Pages P3 to P22.)

A. = Argentine; B. = Brazil; C. = Chile; C.A. = Commonwealth of Australia; D. = Netherlands; De. = Denmark; F. = France; G.B. = Great Britain: G. = Greece; Ger. = Germany; H. = Holland; I. = Italy; J. = Japan; N. = Norway; P. = Poland; Port. = Portugal; R.A.N. = Royal Australian Navy; S. = Spain; Sw. = Sweden; U.S.A. = United States of America; Y.S. = Yugo Slavia.

b. battleship; *b.cr.* battle cruiser; *cr.* cruiser; *a.cr.* armoured cruiser; *air.c.* aircraft carrier; *air.t.* aircraft tender; *f.l.* flotilla leader; *l.cr.* light cruiser; *cr.m.l.* cruiser minelayer; *s.cr.* scout cruiser; *s.cl.cr.* second-class cruiser; *tr. cr.* training cruiser; *d.* destroyer; *t.b.* torpedo boat; *f.cl.d.* first-class destroyer; *t.b.d.* torpedo-boat destroyer; *c.d.* coast defence ship; *sea-p.c.* seaplane carrier.

INDEX TO PLANS OF WARSHIPS (Pages P25 to P104).

A. = Argentine ; B. = Brazil ; C. = Chile ; C.A. = Commonwealth of Australia D. = Netherlands ; F. = France ; Fin. = Finland ; G.B. = Great Britain ; G. = Greece ; Ger. = Germany ; I. = Italy ; J. = Japan ; N. = Norway ; R.A.N. = Royal Australian Navy ; S. = Spain ; Sw. = Sweden ; U.S.A. = United States of America.

b. battleship ; *b.cr.* battle cruiser ; *cr.* cruiser ; *a.cr.* armoured cruiser ; *a.s.* armoured ships ; *a.t.* aviation transport ; *air.c.* aircraft carrier ; *f.l.* flotilla leader ; *l.cr.* light cruiser ; *cr.m.l.* cruiser mine layer ; *sea-p.c.* seaplane carrier ; *s.cr.* scout cruiser ; *s.cl.cr.* second-class cruiser ; *d.* destroyer ; *t.b.d.* torpedo-boat destroyer ; *c.d.* coast defence ship.

INDEX TO PROFILES OF MERCHANT SHIPS.

(See Pages P107 to P166.)

INDEX TO PROFILES OF MERCHANT SHIPS.

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